

Central Texas Stone and Aggregate, LLC

Water Pollution Abatement Plan &
Aboveground Storage Tank Plan
WPAP & AST

Chalk Ridge Shop
601 County Road 239
Florence, TX, 76527
Williamson County

Submitted to: TCEQ Region 11, Austin

Prepared By:



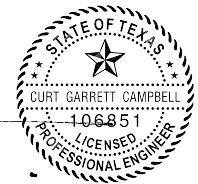
Boerne, Texas
830-249-8284

Date: June 2023
Project No. 10500-039
-MRM-

Signature: _____

Curt G. Campbell, PE - License No. 106851
TX PE Firm No. 4524

Date: 7/27/2023



Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

The Edwards Aquifer Program staff conducts an administrative and technical review of all applications. The turnaround time for administrative review can be up to 30 days as outlined in 30 TAC 213.4(e). Generally administrative completeness is determined during the intake meeting or within a few days of receipt. The turnaround time for technical review of an administratively complete Edwards Aquifer application is 90 days as outlined in 30 TAC 213.4(e). Please know that the review and approval time is directly impacted by the quality and completeness of the initial application that is received. In order to conduct a timely review, it is imperative that the information provided in an Edwards Aquifer application include final plans, be accurate, complete, and in compliance with [30 TAC 213](#).

Administrative Review

1. [Edwards Aquifer applications](#) must be deemed administratively complete before a technical review can begin. To be considered administratively complete, the application must contain completed forms and attachments, provide the requested information, and meet all the site plan requirements. The submitted application and plan sheets should be final plans. Please submit one full-size set of plan sheets with the original application, and half-size sets with the additional copies.

To ensure that all applicable documents are included in the application, the program has developed tools to guide you and web pages to provide all forms, checklists, and guidance. Please visit the below website for assistance: <http://www.tceq.texas.gov/field/eapp>.

2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.
3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.
4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.

An appointment should be made to resubmit the application. The application is re-examined to ensure all deficiencies are resolved. The application will only be deemed administratively complete when all administrative deficiencies are addressed.

5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.
6. If the geologic assessment was completed before October 1, 2004 and the site contains “possibly sensitive” features, the assessment must be updated in accordance with the *Instructions to Geologists* (TCEQ-0585 Instructions).

Technical Review

1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.
2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be

clearly marked, features identified in the geologic assessment should be flagged, roadways marked and the alignment of the Sewage Collection System and manholes should be staked at the time the application is submitted. If the site is not marked the application may be returned.

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied **the application fee will be forfeited.**
4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

Mid-Review Modifications

It is important to have final site plans prior to beginning the permitting process with TCEQ to avoid delays.

Occasionally, circumstances arise where you may have significant design and/or site plan changes after your Edwards Aquifer application has been deemed administratively complete by TCEQ. This is considered a “Mid-Review Modification”. Mid-Review Modifications may require redistribution of an application that includes the proposed modifications for public comment.

If you are proposing a Mid-Review Modification, two options are available:

- If the technical review has begun your application can be denied/withdrawn, your fees will be forfeited, and the plan will have to be resubmitted.
- TCEQ can continue the technical review of the application as it was submitted, and a modification application can be submitted at a later time.

If the application is denied/withdrawn, the resubmitted application will be subject to the administrative and technical review processes and will be treated as a new application. The application will be redistributed to the affected jurisdictions.

Please contact the regional office if you have questions. If your project is located in Williamson, Travis, or Hays County, contact TCEQ’s Austin Regional Office at 512-339-2929. If your project is in Comal, Bexar, Medina, Uvalde, or Kinney County, contact TCEQ’s San Antonio Regional Office at 210-490-3096

Please fill out all required fields below and submit with your application.

1. Regulated Entity Name: Chalk Ridge Shop					2. Regulated Entity No.: New				
3. Customer Name: Joe Bland Construction LP					4. Customer No.: 602465874				
5. Project Type: (Please circle/check one)	<input checked="" type="radio"/> New	Modification			Extension		Exception		
6. Plan Type: (Please circle/check one)	<input checked="" type="radio"/> WPAP	<input type="radio"/> CZP	<input type="radio"/> SCS	<input type="radio"/> UST	<input checked="" type="radio"/> AST	<input type="radio"/> EXP	<input type="radio"/> EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: (Please circle/check one)	<input type="radio"/> Residential		<input type="radio"/> Non-residential			8. Site (acres):		9.17	
9. Application Fee:	\$6,950		10. Permanent BMP(s):			Detention Basin			
11. SCS (Linear Ft.):			12. AST/UST (No. Tanks):			3			
13. County:	Williamson		14. Watershed:			Berry Creek			

Application Distribution

Instructions: Use the table below to determine the number of applications required. One original and one copy of the application, plus additional copies (as needed) for each affected incorporated city, county, and groundwater conservation district are required. Linear projects or large projects, which cross into multiple jurisdictions, can require additional copies. Refer to the “Texas Groundwater Conservation Districts within the EAPP Boundaries” map found at:

http://www.tceq.texas.gov/assets/public/compliance/field_ops/eapp/EAPP%20GWCD%20map.pdf

For more detailed boundaries, please contact the conservation district directly.

Austin Region			
County:	Hays	Travis	Williamson
Original (1 req.)	—	—	<u>X</u>
Region (1 req.)	—	—	<u>X</u>
County(ies)	—	—	<u>X</u>
Groundwater Conservation District(s)	<input type="checkbox"/> Edwards Aquifer Authority <input type="checkbox"/> Barton Springs/ Edwards Aquifer <input type="checkbox"/> Hays Trinity <input type="checkbox"/> Plum Creek	<input type="checkbox"/> Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	<input type="checkbox"/> Austin <input type="checkbox"/> Buda <input type="checkbox"/> Dripping Springs <input type="checkbox"/> Kyle <input type="checkbox"/> Mountain City <input type="checkbox"/> San Marcos <input type="checkbox"/> Wimberley <input type="checkbox"/> Woodcreek	<input type="checkbox"/> Austin <input type="checkbox"/> Bee Cave <input type="checkbox"/> Pflugerville <input type="checkbox"/> Rollingwood <input type="checkbox"/> Round Rock <input type="checkbox"/> Sunset Valley <input type="checkbox"/> West Lake Hills	<input type="checkbox"/> Austin <input type="checkbox"/> Cedar Park <input type="checkbox"/> Florence <input checked="" type="checkbox"/> Georgetown <input type="checkbox"/> Jerrell <input type="checkbox"/> Leander <input type="checkbox"/> Liberty Hill <input type="checkbox"/> Pflugerville <input type="checkbox"/> Round Rock

San Antonio Region					
County:	Bexar	Comal	Kinney	Medina	Uvalde
Original (1 req.)	—	—	—	—	—
Region (1 req.)	—	—	—	—	—
County(ies)	—	—	—	—	—
Groundwater Conservation District(s)	<input type="checkbox"/> Edwards Aquifer Authority <input type="checkbox"/> Trinity-Glen Rose	<input type="checkbox"/> Edwards Aquifer Authority	<input type="checkbox"/> Kinney	<input type="checkbox"/> EAA <input type="checkbox"/> Medina	<input type="checkbox"/> EAA <input type="checkbox"/> Uvalde
City(ies) Jurisdiction	<input type="checkbox"/> Castle Hills <input type="checkbox"/> Fair Oaks Ranch <input type="checkbox"/> Helotes <input type="checkbox"/> Hill Country Village <input type="checkbox"/> Hollywood Park <input type="checkbox"/> San Antonio (SAWS) <input type="checkbox"/> Shavano Park	<input type="checkbox"/> Bulverde <input type="checkbox"/> Fair Oaks Ranch <input type="checkbox"/> Garden Ridge <input type="checkbox"/> New Braunfels <input type="checkbox"/> Schertz	NA	<input type="checkbox"/> San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review.

Curt G. Campbell, PE – TX License No. 106851, TX Firm No. 4524

Print Name of Customer/Authorized Agent



8/28/2023

Signature of Customer/Authorized Agent

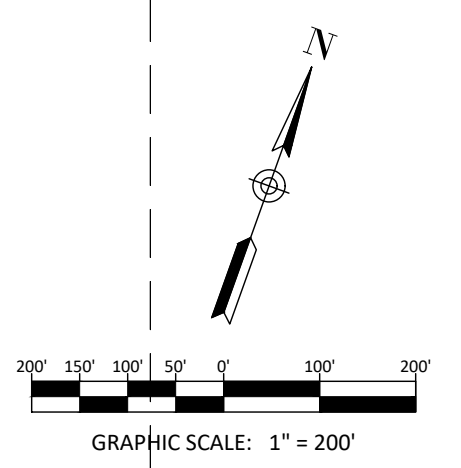
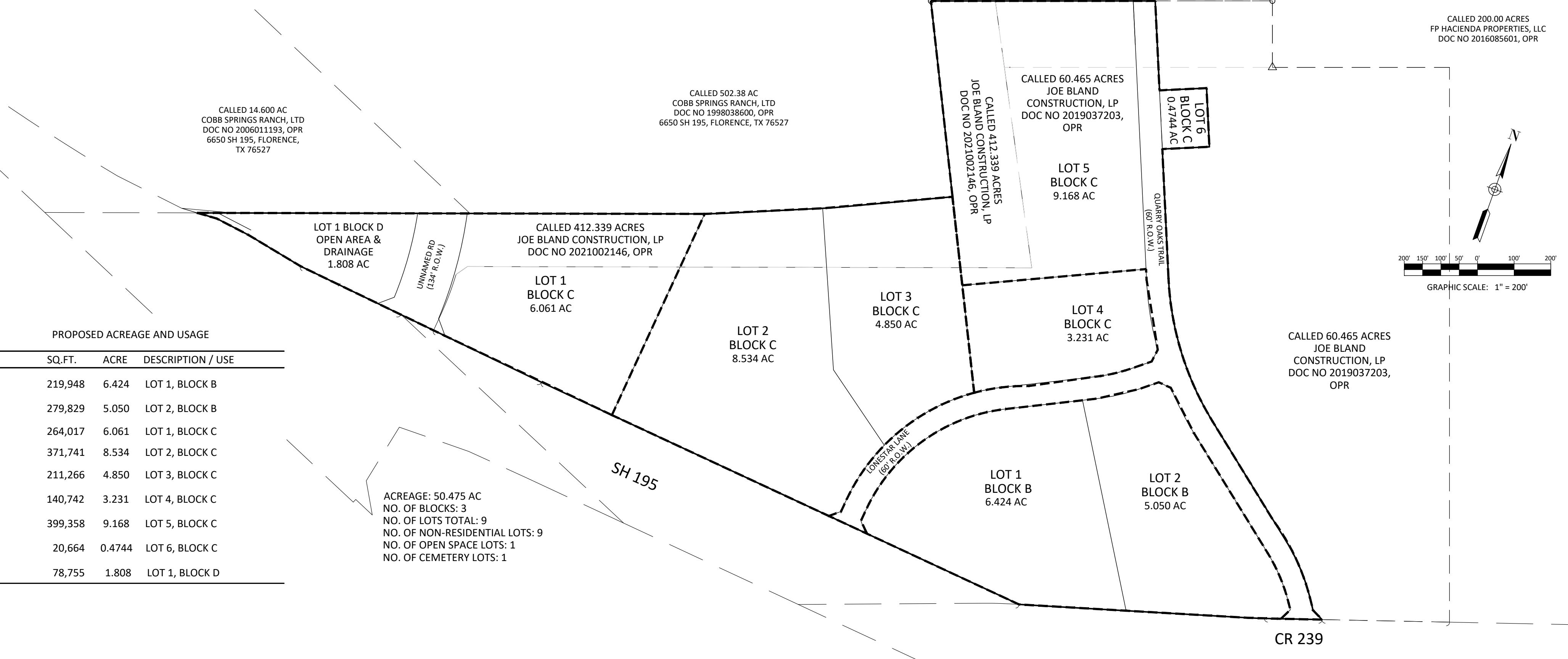
Date

****FOR TCEQ INTERNAL USE ONLY****

Date(s) Reviewed:		Date Administratively Complete:	
Received From:		Correct Number of Copies:	
Received By:		Distribution Date:	
EAPP File Number:		Complex:	
Admin. Review(s) (No.):		No. AR Rounds:	
Delinquent Fees (Y/N):		Review Time Spent:	
Lat./Long. Verified:		SOS Customer Verification:	
Agent Authorization Complete/Notarized (Y/N):		Fee Check:	Payable to TCEQ (Y/N):
Core Data Form Complete (Y/N):			Signed (Y/N):
Core Data Form Incomplete Nos.:			Less than 90 days old (Y/N):

PHASING AND ROADWAY TABLE

NAME	CLASS	ROW	LENGTH OF ROADWAY	PAVEMENT	CURB TYPE	PED CLEAR ZONE	DESIGN SPEED
LONESTAR LANE	NEIGHBORHOOD COLLECTOR	60'	1,183'	32' B-B	6"	10'	35 MPH
QUARRY OAKS TRAIL	NEIGHBORHOOD COLLECTOR	60'	1,782'	32' B-B	6"	10'	35 MPH
UNNAMED ROAD	ARTERIAL	134'	304'	32' B-B	6"	10'	45 MPH
SH 195	STATE HIGHWAY	VARIABLES	N/A	100' ASPHALT	N/A	10'	60 MPH
CR 239	COUNTY ROAD	VARIABLES	N/A	32' ASPHALT	N/A	10'	75 MPH

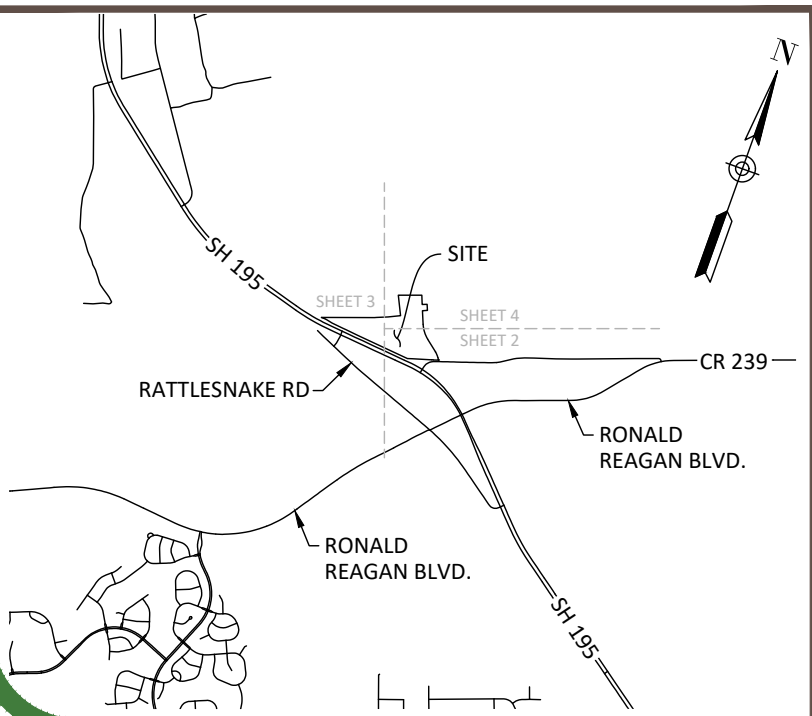


PROPOSED ACREAGE AND USAGE

SQ.FT.	ACRE	DESCRIPTION / USE
219,948	6.424	LOT 1, BLOCK B
279,829	5.050	LOT 2, BLOCK B
264,017	6.061	LOT 1, BLOCK C
371,741	8.534	LOT 2, BLOCK C
211,266	4.850	LOT 3, BLOCK C
140,742	3.231	LOT 4, BLOCK C
399,358	9.168	LOT 5, BLOCK C
20,664	0.4744	LOT 6, BLOCK C
78,755	1.808	LOT 1, BLOCK D

ACREAGE: 50.475 AC
 NO. OF BLOCKS: 3
 NO. OF LOTS TOTAL: 9
 NO. OF NON-RESIDENTIAL LOTS: 9
 NO. OF OPEN SPACE LOTS: 1
 NO. OF CEMETERY LOTS: 1

LOCATION MAP
 SCALE: 1" = 5000'



INDEX:

- SHEET 1 - COVER PAGE/INDEX/LOCATION MAP/OWNER & APPLICANT INFO
- SHEET 2 - EXHIBIT PG 1/BENCHMARK TABLE/PHASING & ROADWAY TABLE
- SHEET 3 - EXHIBIT PG 2/HERITAGE TREE LIST
- SHEET 4 - EXHIBIT PG 3
- SHEET 5 - METES & BOUNDS LEGAL DESCRIPTION/ADDITIONAL MATTERS
- SHEET 6 - CITY & COUNTY NOTES/LINE & CURVE TABLES
- SHEET 7 - CERTIFICATIONS/SIGNATURES

PRELIMINARY
 FOR REVIEW ONLY
 THIS DOCUMENT SHALL NOT BE RECORDED
 FOR ANY PURPOSE AND SHALL NOT BE
 USED OR VIEWED OR RELIED UPON AS A
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 STEGER BIZZELL
 02/20/23

OWNER:

JOE BLAND CONSTRUCTION, L.P.
 13111 DESSAU RD
 AUSTIN, TX 78754
 PHONE: 512.821.2808
 EMAIL: INFO@JOEBLANDCONSTRUCTION.COM

ENGINEER/SURVEYOR/APPLICANT:

STEGER BIZZELL
 1978 S. AUSTIN AVE
 GEORGETOWN, TX 78626
 PHONE: 512.930.9412
 EMAIL: INFO@STEGERBIZZELL.COM

SUBMITTAL DATE: JANUARY 23, 2023

**JBC COMMERCIAL
 PRELIMINARY PLAT**

A 50.475 Acre Subdivision situated in the
 J.A.F. Graves Survey No. 7, Abstract No. 244
 Williamson County, Texas

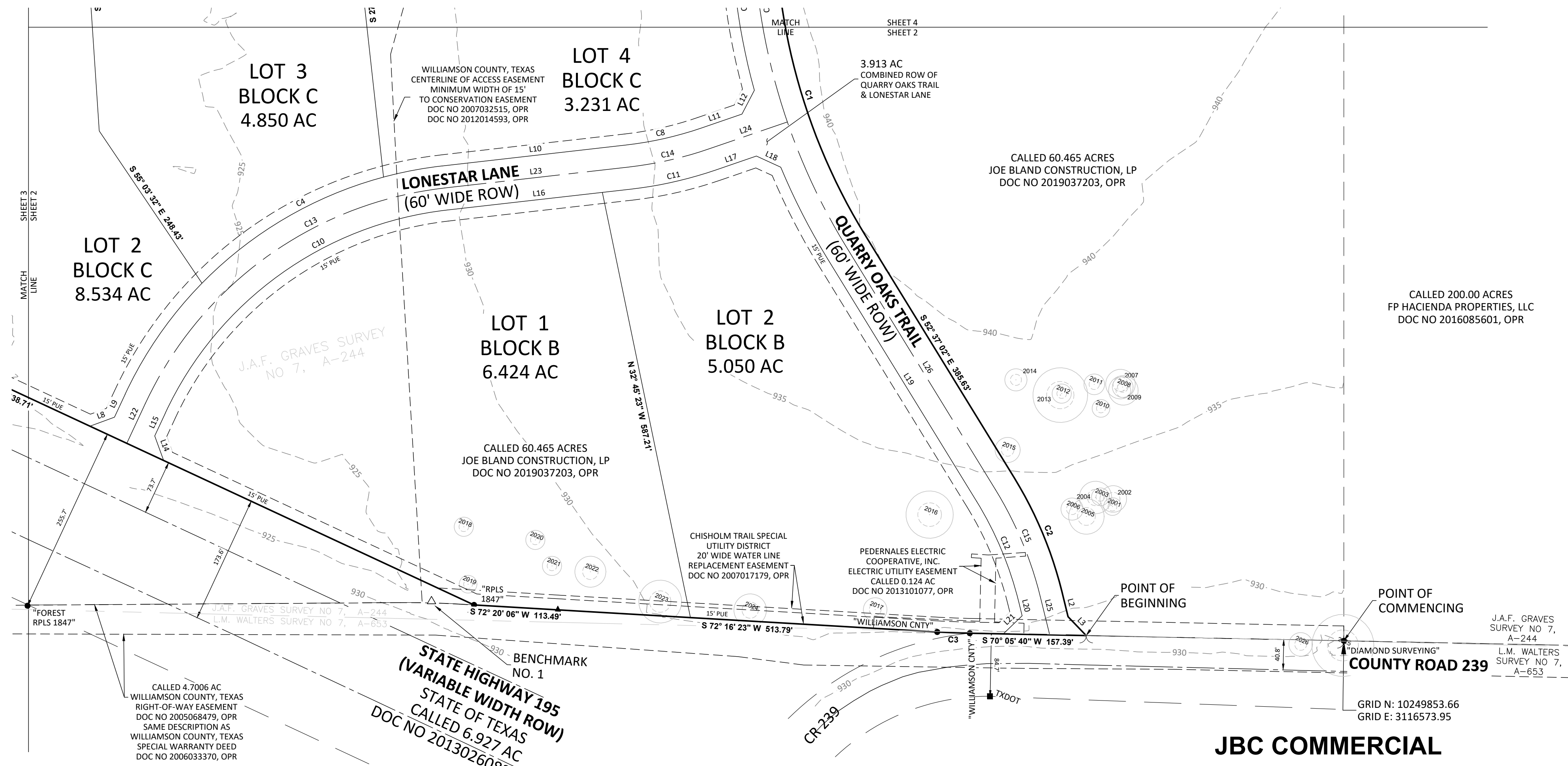
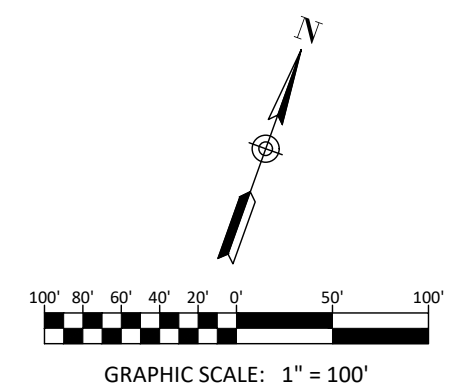


2022-29-PP

ADDRESS	1978 S. AUSTIN AVENUE	GEORGETOWN, TX 78626
METRO	512.930.9412	TEXAS REGISTERED ENGINEERING FIRM F-181 TBPLS FIRM No. 10003700
SERVICES	>>ENGINEERS >>PLANNERS >>SURVEYORS STEGERBIZZELL.COM	

PHASING AND ROADWAY TABLE								
NAME	CLASS	DESIGNATION	ROW	LENGTH OF ROADWAY	PAVEMENT	CURB TYPE	PED CLEAR ZONE	DESIGN SPEED
LONESTAR LANE	NEIGHBORHOOD COLLECTOR	PUBLIC	60'	1,183'	32' B-B	6"	10'	35 MPH
QUARRY OAKS TRAIL	NEIGHBORHOOD COLLECTOR	PUBLIC	60'	1,782'	32' B-B	6"	10'	35 MPH
UNNAMED ROAD	ARTERIAL	PUBLIC	134'	304'	32' B-B	6"	10'	45 MPH
SH 195	STATE HIGHWAY	PUBLIC	VARIABLE	N/A	100' ASPHALT	N/A	10'	60 MPH
CR 239	COUNTY ROAD	PUBLIC	VARIABLE	N/A	32' ASPHALT	N/A	10'	75 MPH

BENCHMARKS				
POINT NO.	NORTHING (FT.)	EASTING (FT.)	ELEVATION (FT)	TYPE
1	10250997.7415	3115871.2634	927.69	MAG NAIL SET (ADJUSTED ELEV.)
2	10252543.9764	3115765.4056	942.12	1/2" IRON ROD WITH CAP (ADJUSTED ELEV.)



LEGEND	
ROW	RIGHT-OF-WAY
OPR	OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY, TEXAS
●	IRON ROD FOUND (1/2" OR AS NOTED)
■	CONCRETE MONUMENT WITH BRASS DISK FOUND (OR AS NOTED)
▲	NAIL FOUND (TYPE AS NOTED)
△	BENCHMARK (POINT NO LISTED)
⊗	POWER POLE
┆	GUY ANCHOR
┆	SIGN POST
—	OVERHEAD WIRES
—	FENCE LINE
○	TREE TO BE REMOVED

PRELIMINARY FOR REVIEW ONLY
 THIS DOCUMENT SHALL NOT BE RECORDED FOR ANY PURPOSE AND SHALL NOT BE USED OR VIEWED OR RELIED UPON AS A FINAL SURVEY DOCUMENT.
 STEGER BIZZELL
 DECEMBER 20, 2021

FOR REVIEW
 THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF REVIEW UNDER THE AUTHORITY OF BRYAN ERIC MOORE, P.E. REG. #98920 ON 2/20/23. IT IS NOT TO BE USED FOR BIDDING, PERMIT OR CONSTRUCTION.

JBC COMMERCIAL
PRELIMINARY PLAT
 A 50.475 Acre Subdivision situated in the J.A.F. Graves Survey No. 7, Abstract No. 244 L.M. Walters Survey, Abstract No. 653 Williamson County, Texas



ADDRESS	1978 S. AUSTIN AVENUE	GEORGETOWN, TX 78626
METRO	512.930.9412	TEXAS REGISTERED ENGINEERING FIRM F-181 TBPLS FIRM No. 10003700
SERVICES	>>ENGINEERS	>>PLANNERS >>SURVEYORS

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P:\22000-22999\22814 JBC SH 195 Property\CAD\Plans\01.21.2023 Submittal\Preliminary Plat.dwg, 2/20/2023 2:35:28 PM

STATE OF TEXAS
CALLED 1.981 AC
DOC NO 2012105981, OPR

CALLLED 14.600 AC
COBB SPRINGS RANCH, LTD
DOC NO 2006011193, OPR
6650 SH 195, FLORENCE, TX 76527

CALLLED 502.38 AC
COBB SPRINGS RANCH, LTD
DOC NO 1998038600, OPR
6650 SH 195, FLORENCE, TX 76527

RELOCATED ROAD
EASEMENT AREA
EXHIBIT 'D'
DOC NO 2019037076, OPR
ACCESS EASEMENT
TRACT 1 (EXISTING ROADWAY TRACT)
CALLED 24.636 AC
DOC NO 2021001637, OPR

GRID N: 10249668.47
GRID E: 3112980.85

STATE HIGHWAY 195
(VARIABLE WIDTH ROW)
STATE OF TEXAS
CALLED 10.028 ACRES
DOC NO 2011041882

CALLLED 412.339 ACRES
JOE BLAND CONSTRUCTION, LP
DOC NO 2021002146, OPR

LOT 1 BLOCK D
DRAINAGE &
OPEN SPACE
1.808 AC

UNNAMED RD
(134' WIDE ROW)
0.9619 AC

LOT 1
BLOCK C
6.061 AC

CALLLED 60.465 ACRES
JOE BLAND CONSTRUCTION, LP
DOC NO 2019037203, OPR

LOT 2
BLOCK C
8.534 AC

STATE HIGHWAY 195
(VARIABLE WIDTH ROW)
STATE OF TEXAS
CALLED 6.927 AC
DOC NO 2013026083, OPR

LEGEND

ROW	RIGHT-OF-WAY
OPR	OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY, TEXAS
●	IRON ROD FOUND (1/2" OR AS NOTED)
■	CONCRETE MONUMENT WITH BRASS DISK FOUND (OR AS NOTED)
▲	NAIL FOUND (TYPE AS NOTED)
△	BENCHMARK (POINT NO LISTED)
○	POWER POLE
⊥	GUY ANCHOR
⊥	SIGN POST
—	OVERHEAD WIRES
—	FENCE LINE
○	TREE TO BE REMOVED



TAG #	Description
2001	12in LIVE OAK
2002	18in LIVE OAK
2003	12in LIVE OAK
2004	22in (M) LIVE OAK
2005	24in (M) LIVE OAK
2006	15in LIVE OAK
2007	20in (M) LIVE OAK
2008	14in (M) LIVE OAK
2009	20in (M) LIVE OAK
2010	12in LIVE OAK
2011	14in LIVE OAK
2012	13in ELM
2013	37in (M) LIVE OAK
2014	15in LIVE OAK
2015	17in ELM

TAG #	Description
2016	32in LIVE OAK
2017	16in (M) ELM
2018	13in (M) HACKBERRY
2019	12in HACKBERRY
2020	13in HACKBERRY
2021	13in HACKBERRY
2022	21in (M) HACKBERRY
2023	29in LIVE OAK
2024	22in LIVE OAK
2025	42in (M) LIVE OAK
2026	16in LIVE OAK
2027	17in LIVE OAK
2028	15in LIVE OAK
2029	15in LIVE OAK
2030	37in (M) LIVE OAK

TAG #	Description
2032	18in LIVE OAK
2033	12in ELM
2034	21in LIVE OAK
2035	16in POST OAK
2036	16in LIVE OAK
2037	26in LIVE OAK
2038	19in POST OAK
2039	13in POST OAK
2040	16in POST OAK
2041	23in POST OAK
2042	20in POST OAK
2043	25in LIVE OAK
2044	12in ELM
2045	13in POST OAK

TAG #	Description
2046	15in ELM
2047	23in POST OAK
2048	18in ELM
2049	16in (M) ELM
2050	14in ELM
2051	14in ELM
2052	14in (M) ELM
2053	13in ELM
2054	14in ELM
2055	17in POST OAK
2056	12in ELM
2057	14in ELM
2058	15in ELM
2059	13in ELM
2060	15in ELM

TAG #	Description
2061	14in ELM
2062	14in ELM
2063	19in POST OAK
2064	15in POST OAK
2065	19in POST OAK
2066	19in ELM
2067	15in ELM
2068	13in ELM
2069	38in (M) LIVE OAK
2070	18in LIVE OAK
2071	31in LIVE OAK
2072	15in LIVE OAK
2073	19in (M) LIVE OAK
2074	13in LIVE OAK
2075	20in (M) LIVE OAK

TAG #	Description
2076	12in LIVE OAK
2077	16in (M) LIVE OAK
2078	16in (M) LIVE OAK
2079	14in LIVE OAK
2080	20in (M) LIVE OAK
2081	14in LIVE OAK
2082	12in LIVE OAK
2083	22in (M) LIVE OAK
2084	17in LIVE OAK DISTRESSED
2085	13in LIVE OAK
2086	14in (M) LIVE OAK
2087	19in LIVE OAK
2088	12in LIVE OAK
2089	22in LIVE OAK
2090	19in (M) LIVE OAK

TAG #	Description
2091	15in LIVE OAK
2092	25in (M) LIVE OAK
2093	19in LIVE OAK
2094	13in LIVE OAK
2095	17in LIVE OAK
2096	17in LIVE OAK
2097	26in LIVE OAK
2098	14in LIVE OAK
2099	15in ELM
2100	22in LIVE OAK
2101	19in LIVE OAK
2102	13in ELM
2103	42in LIVE OAK
2104	19in LIVE OAK
2105	19in LIVE OAK

TAG #	Description
2106	21in LIVE OAK
2107	14in LIVE OAK
2108	28in (M) LIVE OAK
2109	20in LIVE OAK
2110	14in LIVE OAK
2111	21in (M) LIVE OAK
2112	27in LIVE OAK
2113	24in (M) LIVE OAK
2114	14in (M) LIVE OAK
2115	16in LIVE OAK
2116	12in LIVE OAK
2117	14in LIVE OAK
2118	24in LIVE OAK
2119	23in (M) POST OAK
2120	23in (M) POST OAK

TAG #	Description
2121	25in (M) POST OAK
2122	18in (M) POST OAK
2123	14in LIVE OAK
2124	19in (M) LIVE OAK
2125	12in POST OAK
2126	17in (M) POST OAK
2127	16in LIVE OAK
2128	33in LIVE OAK
2129	24in (M) LIVE OAK
2130	16in POST OAK
2131	24in CEDAR
2132	14in (M) LIVE OAK
2133	15in (M) LIVE OAK
2134	14in (M) LIVE OAK
2135	22in LIVE OAK

TAG #	Description
2136	23in (M) LIVE OAK
2137	22in LIVE OAK
2138	18in (M) LIVE OAK
2139	13in (M) LIVE OAK
2140	18in (M) LIVE OAK
2141	22in POST OAK
2142	30in POST OAK
2143	29in POST OAK
2144	17in HACKBERRY
2145	32in LIVE OAK
2146	34in LIVE OAK
2147	35in LIVE OAK
2148	34in LIVE OAK
2149	30in LIVE OAK
2150	25in POST OAK

TAG #	Description
2151	20in LIVE OAK
2152	18in (M) MESQUITE
2153	15in (M) MESQUITE
2154	14in MESQUITE
2155	35in (M) LIVE OAK
2156	28in POST OAK
2157	33in LIVE OAK
2158	13in HACKBERRY
2159	28in POST OAK
2160	12in HACKBERRY
2161	28in LIVE OAK
2162	35in POST OAK
2163	13in HACKBERRY
2164	13in HACKBERRY
2165	18in (M) HACKBERRY

TAG #	Description
2166	22in (M) HACKBERRY
2167	15in LIVE OAK
2168	13in ELM
2169	12in ELM
2170	16in LIVE OAK
2171	30in (M) LIVE OAK
2172	20in POST OAK
2173	20in POST OAK
2174	20in POST OAK
2175	15in ELM
2176	13in ELM
2177	17in (M) ELM
2178	15in ELM
2179	19in LIVE OAK
2180	44in (M) LIVE OAK

TAG #	Description
2181	20in (M) LIVE OAK
2182	24in (M) LIVE OAK
2183	15in (M) LIVE OAK
2184	12in (M) LIVE OAK
2185	18in (M) LIVE OAK
2186	21in (M) LIVE OAK
2187	22in LIVE OAK
2188	12in LIVE OAK
2189	16in LIVE OAK
2190	25in LIVE OAK
2191	19in POST OAK
2192	15in CALLERY PEAR
2193	20in LIVE OAK
2194	15in (M) LIVE OAK
2195	12in LIVE OAK

TAG #	Description
2196	13in (M) LIVE OAK
2197	17in LIVE OAK
2198	16in LIVE OAK
2199	18in (M) LIVE OAK
2200	18in (M) LIVE OAK
2201	25in (M) LIVE OAK
2202	24in (M) LIVE OAK
2203	22in LIVE OAK
2204	14in ELM
2205	17in LIVE OAK
2206	23in LIVE OAK
2207	25in (M) LIVE OAK
2208	13in LIVE OAK
2209	18in LIVE OAK
2210	12in ELM

TAG #	Description
2211	21in (M) LIVE OAK
2212	14in LIVE OAK
2213	18in LIVE OAK
2214	21in (M) LIVE OAK
2215	14in LIVE OAK
2216	14in LIVE OAK

* - INDICATES TREES TO BE REMOVED

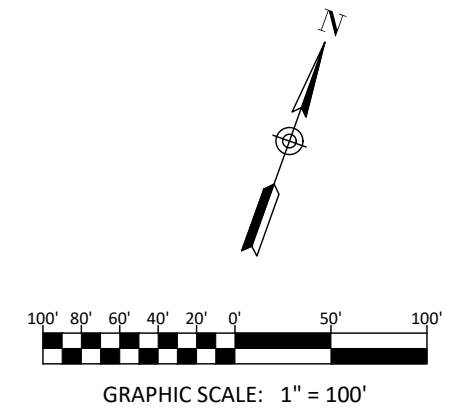
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STEGER BIZZELL
DECEMBER 20, 2021

JBC COMMERCIAL
PRELIMINARY PLAT
A 50.475 Acre Subdivision situated in the
J.A.F. Graves Survey No. 7, Abstract No. 244
L.M. Walters Survey, Abstract No. 653
Williamson County, Texas

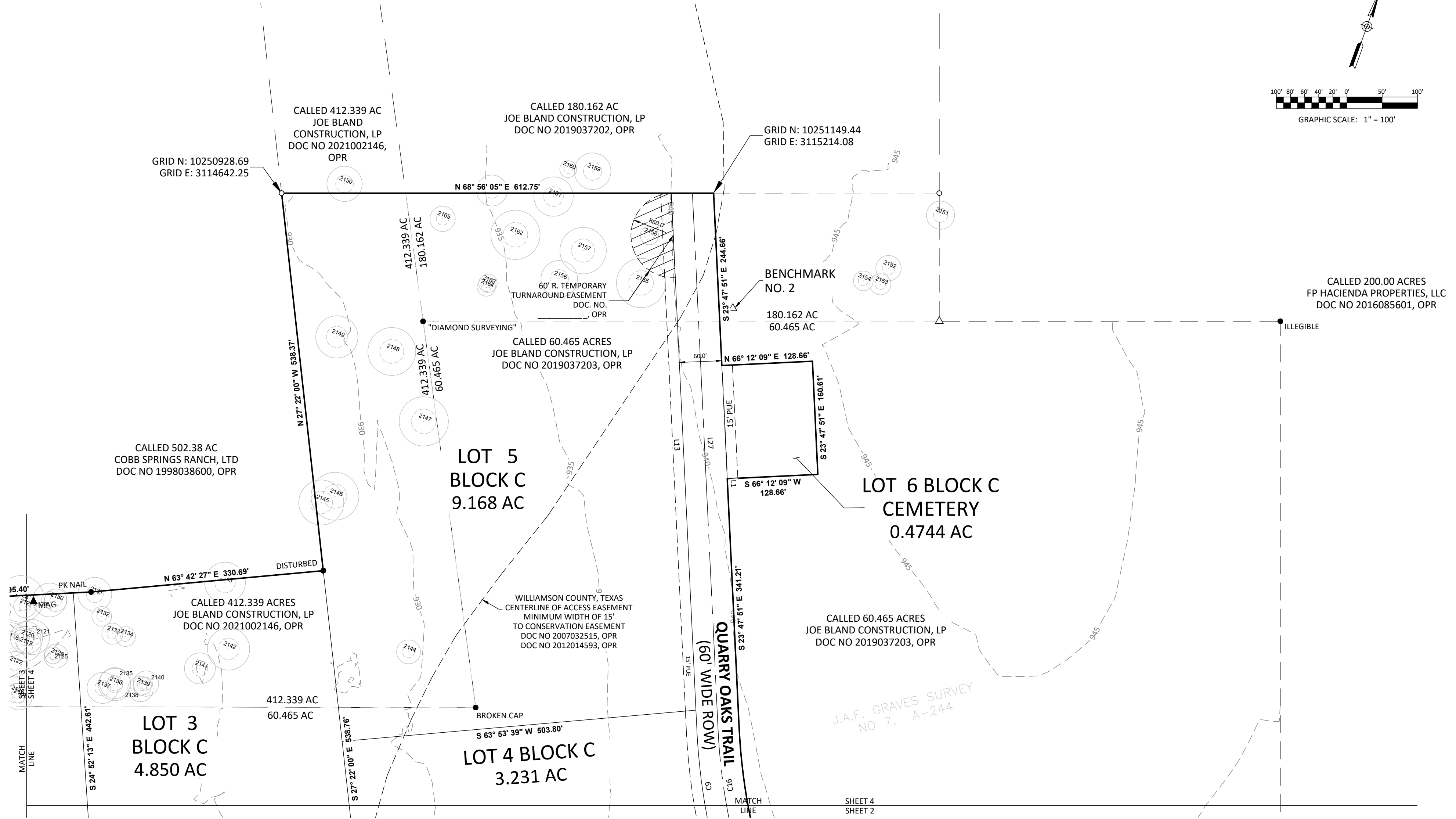


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SERVICES	>>ENGINEERS >>PLANNERS >>SURVEYORS	STEGERBIZZELL.COM

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LEGEND

ROW	RIGHT-OF-WAY
OPR	OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY, TEXAS
●	IRON ROD FOUND (1/2" OR AS NOTED)
■	CONCRETE MONUMENT WITH BRASS DISK FOUND (OR AS NOTED)
▲	NAIL FOUND (TYPE AS NOTED)
△	BENCHMARK (POINT NO LISTED)
⊙	POWER POLE
⊖	GUY ANCHOR
⊠	SIGN POST
—	OVERHEAD WIRES
- - -	FENCE LINE
○	TREE TO BE REMOVED

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 Williamson County, Texas



2022-29-PP

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LEGAL DESCRIPTION:

DESCRIPTION OF A 50.475 ACRE TRACT OF LAND LOCATED IN THE J.A.F. GRAVES SURVEY NO 7, ABSTRACT 244, WILLIAMSON COUNTY, TEXAS, BEING OUT OF THAT CERTAIN CALLED 60.465 ACRE, 412.339 ACRE AND 180.162 ACRE TRACTS OF LAND, ALL CONVEYED TO JOE BLAND CONSTRUCTION, LP, BY SPECIAL WARRANTY DEED OF RECORD IN DOC NO 2019037203, OF THE OFFICIAL PUBLIC RECORDS OF WILLIAMSON COUNTY, TEXAS (OPR), DOC NO 2021002146, OPR, AND DOC NO 2019037202, OPR, SAID 50.475 ACRE TRACT OF LAND BEING SURVEYED ON THE GROUND IN APRIL THROUGH JULY, 2022, UNDER THE SUPERVISION OF PATRICK J. STEVENS, RPLS, AND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

COMMENCING, AT A 1/2 INCH IRON ROD WITH CAP STAMPED "DIAMOND SURVEYING" FOUND ON THE NORTH RIGHT-OF-WAY (ROW) LINE OF COUNTY ROAD NO 239 (CR 239), A VARIABLE WIDTH ROADWAY, DEDICATED BY DOC NO 2006033370, OPR, FOR THE SOUTHERNMOST SOUTHWEST CORNER OF THAT CERTAIN CALLED 200.00 ACRE TRACT OF LAND CONVEYED TO FP HACIENDA PROPERTIES, LLC, BY SPECIAL WARRANTY DEED OF RECORD IN DOC NO 2016085601, OPR, SAME POINT BEING THE SOUTHEAST CORNER OF SAID 60.465 ACRE TRACT OF LAND;

THENCE, SOUTH 70°05'40" WEST WITH THE NORTH ROW LINE OF SAID CR 239 AND A SOUTH BOUNDARY LINE OF SAID 60.465 ACRE TRACT, A DISTANCE OF 348.41 FEET TO THE **POINT OF BEGINNING**;

THENCE, CONTINUING WITH THE NORTH ROW LINE OF SAID CR 239 AND A SOUTH BOUNDARY LINE OF SAID 60.465 ACRE TRACT, THE FOLLOWING FOUR (4) COURSES AND DISTANCES:

- SOUTH 70°05'40" WEST, A DISTANCE OF 157.39 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "WILLIAMSON CNTY" FOUND;
 - WITH A TANGENT CURVE TO THE LEFT AN ARC DISTANCE OF 44.03 FEET, HAVING A RADIUS OF 1,160.00 FEET, A CENTRAL ANGLE OF 002°10'28", AND A CHORD THAT BEARS SOUTH 71°09'50" WEST, A CHORD DISTANCE OF 44.02 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "WILLIAMSON CNTY" FOUND;
 - SOUTH 72°16'23" WEST, A DISTANCE OF 513.79 FEET, TO A NAIL FOUND; AND
 - SOUTH 72°20'06" WEST, A DISTANCE OF 113.49 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "RPLS 1847" FOUND ON THE NORTH ROW LINE OF STATE HIGHWAY 195 (SH 195), A VARIABLE WIDTH ROADWAY, DEDICATED BY DOC NO 2013026083, OPR, AND AT THE NORTHEAST CORNER OF A CALLED 6.927 ACRE TRACT OF LAND CONVEYED TO THE STATE OF TEXAS BY AN AGREED JUDGEMENT OF RECORD IN DOC NO 2013026083, OPR, FOR THE SOUTHERN MOST SOUTHEAST CORNER OF THE HEREIN DESCRIBED TRACT;
- THENCE**, WITH THE NORTH ROW LINE OF SAID SH 195, A SOUTH BOUNDARY LINE OF SAID 60.465 ACRE TRACT, THE SOUTH BOUNDARY LINE OF SAID 412.339 ACRE TRACT, THE NORTH BOUNDARY LINE OF SAID 6.927 ACRE TRACT (2013026083) AND THE NORTH BOUNDARY LINE OF A CALLED 10.028 ACRE TRACT OF LAND DESCRIBED IN A LIS PENDENS RECORDED IN DOC NO 2011041882, OPR, THE FOLLOWING SEVEN (7) COURSES AND DISTANCES:
- NORTH 86°06'00" WEST, A DISTANCE OF 1,438.71 FEET, TO A CONCRETE MONUMENT WITH BRASS DISK STAMPED "TXDOT" FOUND;
 - NORTH 85°19'38" WEST, A DISTANCE OF 327.14 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "DIAMOND SURVEYING" FOUND AT THE SOUTHWEST CORNER OF SAID 60.465 ACRE TRACT AND THE SOUTHEAST CORNER OF SAID 412.339 ACRE TRACT;
 - NORTH 85°22'54" WEST, A DISTANCE OF 97.62 FEET, TO A 5/8 INCH IRON ROD FOUND BENT AT THE NORTHWEST CORNER OF SAID 6.927 ACRE TRACT AND THE NORTHEAST CORNER OF SAID 10.028 ACRE TRACT;
 - NORTH 85°17'09" WEST, A DISTANCE OF 305.53 FEET, TO A CONCRETE MONUMENT WITH BRASS DISK FOUND;
 - NORTH 80°04'36" WEST, A DISTANCE OF 166.15 FEET, TO A CONCRETE MONUMENT WITH BRASS DISK FOUND;
 - NORTH 83°43'43" WEST, A DISTANCE OF 97.37 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "RPLS 1847; AND
 - SOUTH 85°09'33" WEST, A DISTANCE OF 55.36 FEET, TO A CONCRETE MONUMENT WITH BRASS DISK STAMPED "TXDOT" FOUND AT THE NORTHWEST CORNER OF SAID 10.028 ACRE TRACT, THE SOUTHWEST CORNER OF SAID 412.339 ACRE TRACT, THE NORTHEAST CORNER OF A CALLED 1.981

ACRE TRACT OF LAND CONVEYED TO THE STATE OF TEXAS BY SPECIAL WARRANTY DEED RECORDED IN DOC NO 2012105981, OPR, AND THE SOUTHEAST CORNER OF A CALLED 14.600 ACRE TRACT OF LAND CONVEYED TO COBB SPRINGS RANCH, LTD, BY SPECIAL WARRANTY DEED OF RECORD IN DOC NO 2006011193, OPR, FOR THE SOUTHWEST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, WITH A WEST BOUNDARY LINE OF SAID 412.339 ACRE TRACT, THE EAST BOUNDARY LINE OF SAID 14.600 ACRE TRACT AND AN EAST BOUNDARY LINE OF A CALLED 502.38 ACRE TRACT OF LAND CONVEYED TO COBB SPRINGS RANCH, LTD, BY WARRANTY DEED OF RECORD IN DOC NO 1998038600, OPR, THE FOLLOWING FOUR (4) COURSES AND DISTANCES:

- NORTH 69°03'41" EAST, PASSING A 1/2 INCH IRON ROD DISTURBED AT A DISTANCE OF 100.67 BEARING NORTH 25°21'33" WEST 0.24 FEET, CONTINUING FOR A TOTAL DISTANCE OF 1385.85 FEET, TO A 1/2 INCH IRON ROD FOUND;
- NORTH 67°05'39" EAST, A DISTANCE OF 52.57 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "FOREST RPLS 1847" FOUND;
- NORTH 66°00'44" EAST, A DISTANCE OF 295.40 FEET, TO A PK NAIL FOUND; AND
- NORTH 63°42'27" EAST, A DISTANCE OF 330.69 FEET, TO A 1/2 INCH IRON ROD FOUND DISTURBED AT AN INTERIOR ELL CORNER OF SAID 412.339 ACRE TRACT AND AT THE EASTERN MOST CORNER OF SAID 502.38 ACRE TRACT, FOR AN INTERIOR ELL CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 27°22'00" WEST, WITH A WEST BOUNDARY LINE OF SAID 412.339 ACRE TRACT AND AN EAST BOUNDARY LINE OF SAID 502.38 ACRE TRACT, A DISTANCE OF 538.37 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" FOUND FOR THE NORTHWEST CORNER OF THE HEREIN DESCRIBED TRACT;

THENCE, NORTH 68°56'05" EAST, OVER AND ACROSS SAID 412.339 ACRE TRACT AND SAID 180.162 ACRE TRACT, A DISTANCE OF 612.75 FEET, TO A POINT ON AN EAST BOUNDARY LINE OF SAID 180.162 ACRE TRACT, FOR THE NORTHERN MOST NORTHEAST CORNER OF THE HEREIN DESCRIBED TRACT, FROM WHICH A 1/2 INCH IRON ROD WITH ILLEGIBLE CAP FOUND BEARS NORTH 68°56'05" EAST 320.13 FEET ;

THENCE, OVER AND ACROSS SAID 180.162 ACRE TRACT AND THEN SAID 60.465 ACRE TRACT, THE FOLLOWING ELEVEN (11) COURSES AND DISTANCES:

- CROSSING SAID 180.162 ACRE TRACT AND ENTERING SAID 60.465 ACRE TRACT, SOUTH 23°47'51" EAST, A DISTANCE OF 244.66 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" SET;
- CONTINUING ACROSS SAID 60.465 ACRE TRACT, NORTH 66°12'09" EAST, A DISTANCE OF 128.66 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" SET;
- SOUTH 23°47'51" EAST, A DISTANCE OF 160.61 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" SET;
- SOUTH 66°12'09" WEST, A DISTANCE OF 128.66 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" SET;
- SOUTH 23°47'51" EAST, A DISTANCE OF 13.49 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" SET;
- SOUTH 23°47'51" EAST, A DISTANCE OF 341.21 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" SET;
- WITH SAID TANGENT CURVE TO THE LEFT, AN ARC DISTANCE OF 412.46 FEET, HAVING A RADIUS OF 820.00 FEET, A CENTRAL ANGLE OF 028°49'11", AND A CHORD THAT BEARS SOUTH 38°12'26" EAST, A CHORD DISTANCE OF 408.13 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" SET;
- SOUTH 52°37'02" EAST, A DISTANCE OF 385.63 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" SET;
- WITH SAID TANGENT CURVE TO THE RIGHT, AN ARC DISTANCE OF 166.93 FEET, HAVING A RADIUS OF 540.00 FEET, A CENTRAL ANGLE OF 017°42'43", AND A CHORD THAT BEARS SOUTH 43°45'41" EAST, A CHORD DISTANCE OF 166.27 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" SET;
- SOUTH 34°54'19" EAST, A DISTANCE OF 35.11 FEET, TO A 1/2 INCH IRON ROD WITH CAP STAMPED "STEGER BIZZELL" SET; AND
- SOUTH 64°54'20" EAST, A DISTANCE OF 35.36 FEET, TO A THE **POINT OF BEGINNING**, AND CONTAINING 50.475 ACRES OF LAND, MORE OR LESS, WITHIN THESE METES AND BOUNDS.

Allowable Impervious Cover			
Lot No.	Block No.	Area (Acres)	Allowable I.C.
1	B	6.424	3.629
2	B	5.050	2.853
1	C	6.061	3.424
2	C	8.534	4.821
3	C	4.850	2.740
4	C	3.231	1.825
5	C	9.168	5.179
6	C	0.474	0.268
1	D	1.808	1.021

**ALLOWABLE IMPERVIOUS COVER CALCULATED AT 70% FOR FIRST 5.0 ACRES AND AT 55% FOR THE REMAINDER AREA OVER 5.0 ACRES

TOTAL I.C. = 0.7 * 5 . + 0.55 * (50.475 ac. - 5 ac.) = 28.511 ac.
I.C. PERCENTAGE = 28.511 ac./50.475 ac. = 56.5%

ADDITIONAL MATTERS:

- VOL. 527, PG. 529 - 50' WIDE ELECTRIC EASEMENT MAY AFFECT, INSTRUMENT HAS VAGUE DESCRIPTION.
- VOL. 975, PG. 349 - BLANKET WATERLINE EASEMENT LIMITED TO 15' CENTERED ON PIPELINE AS INDICATED.
- VOL. 975, PG. 351 - BLANKET WATERLINE EASEMENT LIMITED TO 15' CENTERED ON PIPELINE AS INDICATED.
- VOL. 975, PG. 353 - BLANKET WATERLINE EASEMENT LIMITED TO 15' CENTERED ON PIPELINE AS INDICATED.
- DOCUMENT NO. 2021001636 - RESTRICTIONS

**JBC COMMERCIAL
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Williamson County, Texas



2022-29-PP

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CITY OF GEORGETOWN NOTES:

1. UTILITY PROVIDERS FOR THIS DEVELOPMENT ARE WATER: WATER WELL, WASTE WATER: ON-SITE SEWAGE FACILITIES AND ELECTRIC: GEORGETOWN UTILITY SYSTEMS.
2. ALL STRUCTURES/ OBSTRUCTIONS ARE PROHIBITED IN DRAINAGE EASEMENTS.
3. ALL SIDEWALKS SHALL BE MAINTAINED BY EACH OF THE ADJACENT PROPERTY OWNERS.
4. THERE ARE NO AREAS WITHIN THE BOUNDARIES OF THIS SUBDIVISION IN THE 100-YEAR FLOODPLAIN AS DEFINED BY FIRM MAP NUMBER 48491C0505F, EFFECTIVE DATE OF DECEMBER 20, 2019.
5. NO STRUCTURE OR LAND IN THIS PLAT SHALL HEREAFTER BE LOCATED OR ALTERED WITHOUT FIRST OBTAINING A CERTIFICATE OF COMPLIANCE OR FLOODPLAIN DEVELOPMENT PERMIT FROM THE WILLIAMSON COUNTY FLOODPLAIN ADMINISTRATOR.
6. IN ORDER TO PROMOTE DRAINAGE AWAY FROM A STRUCTURE, THE SLAB ELEVATION SHOULD BE BUILT AT LEAST ONE-FOOT ABOVE THE SURROUNDING GROUND, AND THE GROUND SHOULD BE GRADED AWAY FROM THE STRUCTURE AT A SLOPE OF 1/2 INCH PER FOOT FOR A DISTANCE OF AT LEAST 10 FEET.
7. ALL SEDIMENTATION, FILTRATION, DETENTION, AND/OR RETENTION BASINS AND RELATED APPURTENANCES SHOWN SHALL BE SITUATED WITHIN A DRAINAGE EASEMENT OR DRAINAGE LOT. THE OWNERS, HOA, OR ASSIGNEES OF THE TRACTS UPON WHICH ARE LOCATED SUCH EASEMENTS, APPURTENANCES, AND DETENTION FACILITIES SHALL MAINTAIN SAME AND BE RESPONSIBLE FOR THEIR MAINTENANCE, ROUTINE INSPECTION AND UPKEEP.
8. PARKLAND DEDICATION IS NOT REQUIRED.
9. ANY HERITAGE TREE AS NOTED ON THIS PLAT IS SUBJECT, IN PERPETUITY, TO THE MAINTENANCE, CARE, PRUNING AND REMOVAL REQUIREMENTS OF THE CITY OF GEORGETOWN. APPROVED REMOVAL DOES NOT REQUIRE MODIFICATION OF THE PLAT.
10. ALL INDIVIDUAL LOTS CONTAINING HERITAGE TREES ARE CONFIGURED AND DESIGNED SO THAT THE LOT IS DEVELOPABLE FOR THE INTENDED PURPOSE WITHOUT REQUIRING REMOVAL OF THE HERITAGE TREES OR EXCEEDING THE PERCENTAGE OF ALLOWABLE DISTURBANCE WITHIN THE HERITAGE TREES CRZ.
11. A 10-FOOT OR 15-FOOT PUBLIC UTILITY EASEMENT IS DEDICATED ALONG ALL STREET FRONTAGES AS SHOWN WITHIN THIS PLAT.
12. THE MONUMENTS OF THIS PLAT HAVE BEEN ROTATED TO THE NAD 83/93 HARN - TEXAS CENTRAL ZONE AND NAVD 88.
13. THE MAXIMUM IMPERVIOUS COVERAGE PER NON-RESIDENTIAL LOT SHALL BE PURSUANT TO THE UDC AT THE TIME OF SITE PLAN APPLICATION BASED ON THE ZONING DESIGNATION OF THE PROPERTY.
14. THE LANDOWNER ASSUMES ALL RISKS ASSOCIATED WITH IMPROVEMENTS LOCATED IN THE RIGHT-OF-WAY, OR ROAD WIDENING EASEMENTS. BY PLACING ANYTHING IN THE RIGHT-OF-WAY, OR ROAD WIDENING EASEMENTS, THE LANDOWNER INDEMNIFIES AND HOLDS THE CITY OF GEORGETOWN, WILLIAMSON COUNTY, THEIR OFFICERS, AGENTS AND EMPLOYEES HARMLESS FROM ANY LIABILITY OWING TO PROPERTY DEFECTS OR NEGLIGENCE NOT ATTRIBUTABLE TO THEM AND ACKNOWLEDGES THAT THE IMPROVEMENTS MAY BE REMOVED BY THE CITY AND/OR COUNTY AND THAT THE OWNER OF THE IMPROVEMENTS WILL BE RESPONSIBLE FOR THE RELOCATION AND/OR REPLACEMENT OR THE IMPROVEMENTS.
15. THE BUILDING OF ALL STREETS, ROADS, AND OTHER PUBLIC THOROUGHFARES AND ANY BRIDGES OR CULVERTS NECESSARY TO BE CONSTRUCTED OR PLACED IS THE RESPONSIBILITY OF THE OWNERS OF THE TRACT OF LAND COVERED BY THIS PLAT IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS PRESCRIBED BY THE CITY OF GEORGETOWN AND/OR WILLIAMSON COUNTY, TEXAS. NEITHER THE CITY OF GEORGETOWN NOR WILLIAMSON COUNTY ASSUMES ANY OBLIGATION TO BUILD ANY OF THE STREETS, ROADS, OR OTHER PUBLIC THOROUGHFARES SHOWN ON THIS PLAT OR OF CONSTRUCTING ANY OF THE BRIDGES OR DRAINAGE IMPROVEMENTS IN CONNECTION THEREWITH. NEITHER THE CITY OF GEORGETOWN NOR WILLIAMSON COUNTY ASSUMES ANY RESPONSIBILITY FOR DRAINAGE WAYS OR EASEMENTS IN THE SUBDIVISION, OTHER THAN THOSE DRAINING OR PROTECTING THE ROAD SYSTEM AND STREETS IN THEIR RESPECTIVE JURISDICTIONS.
16. NEITHER THE CITY OF GEORGETOWN NOR WILLIAMSON COUNTY ASSUMES ANY RESPONSIBILITY FOR THE ACCURACY OF REPRESENTATIONS BY OTHER PARTIES IN THIS PLAT. FLOODPLAIN DATA, IN PARTICULAR, MAY CHANGE DEPENDING ON SUBSEQUENT DEVELOPMENT. IT IS FURTHER UNDERSTOOD THAT THE OWNERS OF THE TRACT OF LAND COVERED BY THIS PLAT MUST INSTALL AT THEIR OWN EXPENSE ALL TRAFFIC CONTROL DEVICES AND SIGNAGE THAT MAY BE REQUIRED BEFORE THE STREETS IN THE SUBDIVISION HAVE FINALLY BEEN ACCEPTED FOR MAINTENANCE BY THE CITY AND/OR COUNTY.
17. RIGHT-OF-WAY EASEMENTS FOR WIDENING ROADWAYS OR IMPROVING DRAINAGE SHALL BE MAINTAINED BY THE LANDOWNER UNTIL ROAD OR DRAINAGE IMPROVEMENTS ARE ACTUALLY CONSTRUCTED ON THE PROPERTY. THE CITY AND/OR COUNTY HAVE THE RIGHT AT ANY TIME TO TAKE POSSESSION OF ANY ROAD WIDENING EASEMENT FOR CONSTRUCTION, IMPROVEMENT, OR MAINTENANCE OF THE ADJACENT ROAD.
18. UNLESS OTHERWISE NOTED HEREIN, ALL EASEMENTS DEDICATED TO THE CITY OF GEORGETOWN BY THIS PLAT SHALL BE EXCLUSIVE TO THE CITY OF GEORGETOWN, AND GRANTOR COVENANTS THAT GRANTOR AND GRANTOR'S HEIRS, SUCCESSORS, AND ASSIGNS SHALL NOT CONVEY ANY OTHER EASEMENT, LICENSE, OR CONFLICTING RIGHT TO USE IN ANY MANNER, THE AREA (OR ANY PORTION THEREOF) COVERED BY THIS GRANT.
19. ALL EASEMENTS DEDICATED TO THE CITY OF GEORGETOWN BY THIS PLAT ADDITIONALLY INCLUDE THE FOLLOWING RIGHTS: (1) THE RIGHT OF THE CITY TO CHANGE THE SIZE OF ANY FACILITIES INSTALLED, MAINTAINED, OR OPERATED WITHIN THE EASEMENTS AREA; (2) THE RIGHT OF THE CITY TO RELOCATE ANY FACILITIES WITHIN THE EASEMENT AREA; AND (3) THE RIGHT OF THE CITY TO REMOVE FROM THE EASEMENT AREA ALL TREES AND PARTS THEREOF, OR OTHER OBSTRUCTIONS, WHICH ENDANGER OR MAY INTERFERE WITH THE EFFICIENCY AND MAINTENANCE OF ANY FACILITIES WITHIN THE EASEMENT AREA.
20. THIS PLAT IS SUBJECT TO THE PROVISIONS OF THE CITY OF GEORGETOWN WATER CONSERVATION ORDINANCE.
21. THE SUBDIVISION SUBJECT TO THIS APPLICATION IS SUBJECT TO THE WATER QUALITY REGULATIONS OF THE CITY OF GEORGETOWN.
22. A GEOLOGIC ASSESSMENT, IN ACCORDANCE WITH THE CITY OF GEORGETOWN WATER QUALITY REGULATIONS, WAS COMPLETED ON JUNE 8, 2021. ANY SPRINGS AND STREAMS AS IDENTIFIED IN THE GEOLOGIC ASSESSMENT ARE SHOWN HEREIN.
23. A STORM WATER PERMIT MUST BE SUBMITTED TO THE CITY FOR ANY ADDITIONAL IMPERVIOUS COVER ON ANY LOT.
24. BLOCK D LOT 1 AND BLOCK C LOT 6 WILL NEVER BE SERVICED BY ON-SITE SEWAGE FACILITY OR ON-SITE WELL WATER.

Line Table		
Line #	Direction	Length
L1	S 23°47'51" E	13.49'
L2	S 34°54'19" E	35.11'
L3	S 64°54'20" E	35.36'
L4	N 83°43'43" W	97.37'
L5	S 85°09'33" W	55.36'
L6	N 48°27'57" E	48.40'
L7	S 41°25'07" E	50.43'
L8	N 48°53'58" E	35.36'
L9	N 03°54'07" E	34.34'
L10	N 62°27'04" E	250.16'
L11	N 49°58'52" E	58.21'
L12	N 06°21'57" E	36.20'
L13	N 23°47'51" W	733.61'
L14	N 41°05'56" W	35.35'
L15	N 03°54'07" E	34.34'
L16	N 62°27'04" E	250.16'
L17	N 49°58'52" E	58.21'
L18	S 86°24'13" E	36.20'
L19	S 52°37'02" E	385.63'
L20	N 34°54'19" W	19.03'

Line Table		
Line #	Direction	Length
L21	S 25°05'40" W	35.36'
L22	N 03°54'07" E	59.34'
L23	N 62°27'04" E	250.16'
L24	N 49°58'52" E	112.70'
L25	S 34°54'19" E	52.95'
L26	S 52°37'02" E	385.63'
L27	S 23°47'51" E	100.61'

Curve Table					
Curve #	Length	Radius	Delta	Bearing	Chord
C4	551.81'	540.00'	058°32'57"	N 33°10'35" E	528.11'
C5	238.55'	1013.00'	013°29'33"	N 05°31'17" W	238.00'
C6	298.51'	1147.00'	014°54'41"	S 05°49'53" E	297.67'
C7	303.57'	1080.00'	016°06'17"	N 04°45'25" W	302.57'
C8	104.47'	480.00'	012°28'12"	N 56°12'58" E	104.26'
C9	194.14'	880.00'	012°38'25"	N 30°07'03" W	193.75'
C10	490.50'	480.00'	058°32'57"	N 33°10'35" E	469.44'
C11	117.53'	540.00'	012°28'12"	N 56°12'58" E	117.30'
C12	148.38'	480.00'	017°42'43"	N 43°45'41" W	147.79'
C13	521.16'	510.00'	058°32'57"	N 33°10'35" E	498.78'
C14	111.00'	510.00'	012°28'12"	N 56°12'58" E	110.78'
C15	157.66'	510.00'	017°42'43"	S 43°45'41" E	157.03'
C16	427.55'	850.00'	028°49'11"	S 38°12'26" E	423.06'

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JBC COMMERCIAL PRELIMINARY PLAT

A 50.475 Acre Subdivision situated in the
J.A.F. Graves Survey No. 7, Abstract No. 244
L.M. Walters Survey, Abstract No. 653
Williamson County, Texas



2022-29-PP

PRELIMINARY
FOR REVIEW ONLY
THIS DOCUMENT SHALL NOT BE RECORDED
FOR ANY PURPOSE AND SHALL NOT BE
USED OR VIEWED OR RELIED UPON AS A
FINAL SURVEY DOCUMENT.
STEGER BIZZELL
DECEMBER 20, 2021

ADDRESS	1978 S. AUSTIN AVENUE	GEORGETOWN, TX 78626
METRO	512.930.9412	TEXAS REGISTERED ENGINEERING FIRM F-181 TBPLS FIRM No. 10003700
SERVICES	>>ENGINEERS >>PLANNERS >>SURVEYORS	
WEB		STEGERBIZZELL.COM

P:\22000-22999\22814 JBC SH 195 Property\CAD\Plans\01.21.2023 Submittal\Preliminary Plat.dwg, 2/20/2023 2:35:44 PM

These drawings are the sole property of STEGER BIZZELL. The use of these drawings is hereby restricted to the original site for which they were prepared. Reproduction or reuse of these drawings in whole or in part without written permission of STEGER BIZZELL is strictly prohibited.

STATE OF TEXAS {
KNOW ALL MEN BY THESE PRESENTS
COUNTY OF WILLIAMSON {

I, PATRICK J. STEVENS, REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF TEXAS, DO HEREBY CERTIFY THAT THIS PLAT IS TRUE AND CORRECTLY MADE FROM AN ACTUAL SURVEY MADE ON THE GROUND OF THE PROPERTY LEGALLY DESCRIBED HEREON, AND THAT THERE ARE NO APPARENT DISCREPANCIES, CONFLICTS, VISIBLE UTILITY LINES OR ROADS IN PLACE, EXCEPT AS SHOWN ON THE ACCOMPANYING PLAT, AND THAT THE CORNER MONUMENTS SHOWN THEREON WERE PROPERLY PLACED UNDER MY SUPERVISION IN ACCORDANCE WITH THE SUBDIVISION REGULATIONS OF THE CITY OF GEORGETOWN, TEXAS.

TO CERTIFY WHICH, WITNESS MY HAND AND SEAL AT GEORGETOWN, WILLIAMSON, TEXAS, THIS

_____ DAY OF _____, 20__.

PATRICK J. STEVENS, RPLS
REGISTERED PROFESSIONAL SURVEYOR NO. 5784
STATE OF TEXAS

PRELIMINARY
FOR REVIEW ONLY
THIS DOCUMENT SHALL NOT BE RECORDED
FOR ANY PURPOSE AND SHALL NOT BE
USED OR VIEWED OR RELIED UPON AS A
FINAL SURVEY DOCUMENT.
STEGER BIZZELL
DECEMBER 20, 2021

I, BRYAN ERIC MOORE, REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS, DO HEREBY CERTIFY THAT THIS SUBDIVISION IS IN THE EDWARDS AQUIFER RECHARGE ZONE AND IS NOT ENCRACED BY A ZONE A FLOOD AREA, AS DENOTED HEREIN, AND AS DEFINED BY FEDERAL EMERGENCY MANAGEMENT ADMINISTRATION FLOOD HAZARD BOUNDARY MAP, COMMUNITY PANEL NUMBER 48491C0505F, EFFECTIVE DATE DECEMBER 20, 2019, AND THAT EACH LOT CONFORMS TO THE CITY OF GEORGETOWN REGULATIONS. THE FULLY DEVELOPED, CONCENTRATED STORMWATER RUNOFF RESULTING FROM THE ONE HUNDRED (100) YEAR FREQUENCY STORM IS CONTAINED WITHIN THE DRAINAGE EASEMENTS SHOWN AND/OR PUBLIC RIGHTS-OF-WAY DEDICATED BY THIS PLAT.

TO CERTIFY WHICH, WITNESS MY HAND AND SEAL AT GEORGETOWN, WILLIAMSON, TEXAS, THIS

_____ DAY OF _____, 20__.

BRYAN ERIC MOORE
REGISTERED PROFESSIONAL ENGINEER NO. 98920
STATE OF TEXAS

FOR REVIEW

THIS DOCUMENT IS
RELEASED FOR THE
PURPOSE OF REVIEW
UNDER THE AUTHORITY OF
BRYAN ERIC MOORE, P.E.
REG. #98920 ON 2/20/23.
IT IS NOT TO BE USED FOR
BIDDING, PERMIT OR
CONSTRUCTION.

STATE OF TEXAS {
KNOW ALL MEN BY THESE PRESENTS
COUNTY OF WILLIAMSON {

JOE BLAND CONSTRUCTION, L.P., A TEXAS LIMITED PARTNERSHIP, ACTING BY AND THROUGH JOE E. BLAND, PRESIDENT, OWNER OF THE CERTAIN TRACT OF LAND SHOWN HEREON AND DESCRIBED IN DEEDS RECORDED IN DOCUMENT NO. 2019037203, 2021002146 AND 2019037202, ALL OUT OF THE OFFICIAL RECORDS OF WILLIAMSON COUNTY, TEXAS, DO HEREBY STATE THAT THERE ARE NO LIEN HOLDERS OF THE CERTAIN TRACT OF LAND; DO HEREBY SUBDIVIDE SAID TRACT AS SHOWN HEREON; DO HEREBY COVENANT TO ALL RESTRICTIONS LISTED HEREIN, WHICH SHALL RUN WITH THE LAND; AND DO HEREBY DEDICATE TO WILLIAMSON COUNTY, THE STREETS, ALLEYS, RIGHTS-OF-WAY, EASEMENTS AND PUBLIC PLACES SHOWN HEREON FOR SUCH PUBLIC PURPOSES AS WILLIAMSON COUNTY MAY DEEM APPROPRIATE. I HEREBY BIND MY HEIRS, SUCCESSORS, AND ASSIGNS TO WARRANT AND FOREVER DEFEND SUCH DEDICATIONS, ALL AND SINGULAR, TO THE CITY OF GEORGETOWN AND WILLIAMSON COUNTY, AGAINST EVERY PERSON WHOMSOEVER CLAIMING OR TO CLAIM THE SAME OR ANY PART THEREOF. THIS SUBDIVISION IS TO BE KNOWN AS:

JBC COMMERCIAL

TO CERTIFY WHICH, WITNESS BY MY HAND THIS

_____ DAY OF _____, 20__.

JOE BLAND CONSTRUCTION, L.P., A TEXAS LIMITED PARTNERSHIP

BY: JOE E. BLAND, PRESIDENT,
13111 DESSAU ROAD,
AUSTIN, TX 78754

STATE OF TEXAS {
KNOW ALL MEN BY THESE PRESENTS
COUNTY OF WILLIAMSON {

BEFORE ME, THE UNDERSIGNED, A NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE, ON THIS DAY PERSONALLY APPEARED JOE E. BLAND KNOWN TO ME TO BE THE PERSON WHOSE NAME IS SUBSCRIBED TO THE FOREGOING INSTRUMENT.

GIVEN UNDER MY HAND AND SEAL OF OFFICE THIS

_____ DAY OF _____, 20__.

NOTARY PUBLIC IN AND FOR THE STATE OF TEXAS

MY COMMISSION EXPIRES ON: _____

BASED UPON THE REPRESENTATIONS OF THE ENGINEER OR SURVEYOR WHOSE SEAL IS AFFIXED HERETO, AND AFTER REVIEW OF THE PLAT AS REPRESENTED BY THE SAID ENGINEER OR SURVEYOR, I FIND THAT THIS PLAT COMPLIES WITH THE WILLIAMSON COUNTY FLOODPLAIN REGULATIONS. THIS CERTIFICATION IS MADE SOLELY UPON SUCH REPRESENTATIONS AND SHOULD NOT BE RELIED UPON FOR VERIFICATIONS OF THE FACTS ALLEGED. WILLIAMSON COUNTY DISCLAIMS ANY RESPONSIBILITY TO ANY MEMBER OF THE PUBLIC FOR INDEPENDENT VERIFICATION OF THE REPRESENTATIONS, FACTUAL OR OTHERWISE, CONTAINED IN THIS PLAT AND THE DOCUMENTS ASSOCIATED WITHIN IT.

J. TERRON EVERTSON, P.E., D.R., C.F.M. DATE
WILLIAMSON COUNTY FLOODPLAIN ADMINISTRATOR

BASED UPON THE ABOVE REPRESENTATIONS OF THE ENGINEER OR SURVEYOR WHOSE SEAL IS AFFIXED HERETO, AND AFTER A REVIEW OF THE SURVEY AS REPRESENTED BY THE SAID ENGINEER OR SURVEYOR, I FIND THAT THIS PLAT COMPLIES WITH THE REQUIREMENTS OF EDWARDS AQUIFER REGULATIONS FOR WILLIAMSON COUNTY AND WILLIAMSON COUNTY ON-SITE SEWAGE FACILITY REGULATIONS. THIS CERTIFICATION IS MADE SOLELY UPON SUCH REPRESENTATIONS AND SHOULD NOT BE RELIED UPON FOR VERIFICATIONS OF THE FACTS ALLEGED. THE WILLIAMSON COUNTY ENGINEER'S OFFICE AND WILLIAMSON COUNTY DISCLAIMS ANY RESPONSIBILITY TO ANY MEMBER OF THE PUBLIC FOR INDEPENDENT VERIFICATION OF THE REPRESENTATIONS, FACTUAL OR OTHERWISE, CONTAINED IN THIS PLAT AND THE DOCUMENTS ASSOCIATED WITH IT.

J. TERRON EVERTSON, P.E., D.R., C.F.M. DATE
WILLIAMSON COUNTY ENGINEER

CITY BUILDING OFFICIAL – NO FLOODPLAIN PRESENT ON PLAT

BASED UPON THE ABOVE REPRESENTATIONS OF THE ENGINEER OR SURVEYOR WHOSE SEAL IS AFFIXED HERETO, AND AFTER A REVIEW OF THE PLAT AS REPRESENTED BY THE SAID ENGINEER OR SURVEYOR, I FIND THAT THIS PLAT COMPLIES WITH THE REQUIREMENTS OF CHAPTER 15.44, FLOOD DAMAGE PREVENTION, OF THE GEORGETOWN MUNICIPAL CODE. THIS CERTIFICATION IS MADE SOLELY UPON SUCH REPRESENTATIONS AND SHOULD NOT BE RELIED UPON FOR VERIFICATIONS OF THE FACTS ALLEGED. THE CITY OF GEORGETOWN DISCLAIMS ANY RESPONSIBILITY TO ANY MEMBER OF THE PUBLIC OR INDEPENDENT VERIFICATIONS OF THE REPRESENTATION, FACTUAL OR OTHERWISE, CONTAINED IN THIS PLAT AND THE DOCUMENTS ASSOCIATED WITH IT.

GLEN HOLCOMB,
BUILDING OFFICIAL
CITY OF GEORGETOWN

DATE

PLANNING DIRECTOR SIGNATURE BLOCK

I, SOFIA NELSON, PLANNING DIRECTOR OF THE CITY OF GEORGETOWN, TEXAS, DO HEREBY CERTIFY THIS PLAT IS APPROVED FOR FILING OF RECORD WITH THE COUNTY CLERK OF WILLIAMSON COUNTY, TEXAS.

SOFIA NELSON, PLANNING DIRECTOR DATE

PLANNING AND ZONING COMMISSION

THIS SUBDIVISION TO BE KNOWN AS JBC COMMERCIAL HAS BEEN ACCEPTED AND APPROVED FOR FILING OF RECORD WITH THE COUNTY CLERK OF WILLIAMSON COUNTY, TEXAS, ACCORDING TO THE MINUTES OF THE MEETING OF THE GEORGETOWN PLANNING AND ZONING COMMISSION

ON THE ____ DAY OF _____, 20__, A.D.

TRAVIS PERTHUIS, CHAIRMAN DATE

CHERE HEINTZMANN, VICE-CHAIR DATE

STATE OF TEXAS {
KNOW ALL MEN BY THESE PRESENTS
COUNTY OF WILLIAMSON {

I, NANCY RISTER, CLERK OF THE COUNTY COURT OF SAID COUNTY, DO HEREBY CERTIFY THAT THE FOREGOING INSTRUMENT IN WRITING, WITH ITS CERTIFICATE OF AUTHENTICATION WAS FILED FOR RECORD IN MY OFFICE ON THE _____ DAY OF _____, 20__, A.D., AT ____ O'CLOCK, __.M., AND DULY RECORDED THIS THE _____ DAY OF _____, 20__, A.D., AT ____ O'CLOCK, __.M., IN THE OFFICIAL PUBLIC RECORDS OF SAID COUNTY IN DOCUMENT NO. _____.

TO CERTIFY WHICH, WITNESS MY HAND AND SEAL AT THE COUNTY COURT OF SAID COUNTY, AT MY OFFICE IN GEORGETOWN, TEXAS, THE DATE LAST SHOWN ABOVE WRITTEN.

NANCY RISTER, CLERK
COUNTY COURT OF WILLIAMSON COUNTY, TEXAS

BY: _____, DEPUTY

JBC COMMERCIAL
PRELIMINARY PLAT

A 50.475 Acre Subdivision situated in the
J.A.F. Graves Survey No. 7, Abstract No. 244
L.M. Walters Survey, Abstract No. 653
Williamson County, Texas



2022-29-PP

ADDRESS	1978 S. AUSTIN AVENUE	GEORGETOWN, TX 78626
METRO	512.930.9412	TEXAS REGISTERED ENGINEERING FIRM F-181 TBPLS FIRM No. 10003700
SERVICES	>>ENGINEERS	>>PLANNERS >>SURVEYORS

General Information Form

Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge and Transition Zones and Relating to 30 TAC §213.4(b) & §213.5(b)(2)(A), (B) 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.

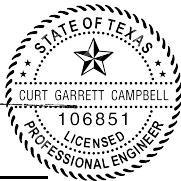
Signature

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 **General Information Form** is hereby submitted for TCEQ review. The application was prepared by:

Print Name of Customer/Agent: Curt G. Campbell - PE, TX License No. 106851, TX Firm. 4524

Date: 7/27/2023

Signature of Customer/Agent:



Project Information

1. Regulated Entity Name: Chalk Ridge Shop
2. County: Williamson County
3. Stream Basin: Colorado River Basin
4. Groundwater Conservation District (If applicable): N/A

5. Edwards Aquifer Zone:

- Recharge Zone
 Transition Zone

6. Plan Type:

- WPAP
 SCS
 Modification

- AST
 UST
 Exception Request

7. Customer (Applicant):

Contact Person: Cole Bland

Entity: Central Texas Stone and Aggregate, LLC

Mailing Address: 13111 Desau Road

City, State: Austin, TX

Zip: 78754

Telephone: 512-821-2808

FAX: _____

Email Address: cole@joeblandconstruction.com

8. Agent/Representative (If any):

Contact Person: Curt G. Campbell

Entity: Westward Environmental Inc.

Mailing Address: 4 Shooting Club Road

City, State: Boerne, TX

Zip: 78006

Telephone: 830-249-8284

FAX: _____

Email Address: ccampbell@westwardenv.com

9. Project Location:

The project site is located inside the city limits of _____.

The project site is located outside the city limits but inside the ETJ (extra-territorial jurisdiction) of Georgetown.

The project site is not located within any city's limits or ETJ.

10. The location of the project site is described below. The description provides sufficient detail and clarity so that the TCEQ's Regional staff can easily locate the project and site boundaries for a field investigation.

From I-35, 5.8 miles on Highway 195, Turn Right onto CR 239, on your left in 0.1 miles

11. **Attachment A – Road Map.** A road map showing directions to and the location of the project site is attached. The project location and site boundaries are clearly shown on the map.

12. **Attachment B - USGS / Edwards Recharge Zone Map.** A copy of the official 7 ½ minute USGS Quadrangle Map (Scale: 1" = 2000') of the Edwards Recharge Zone is attached. The map(s) clearly show:

Project site boundaries.

USGS Quadrangle Name(s).

Boundaries of the Recharge Zone (and Transition Zone, if applicable).

Drainage path from the project site to the boundary of the Recharge Zone.

13. **The TCEQ must be able to inspect the project site or the application will be returned.** Sufficient survey staking is provided on the project to allow TCEQ regional staff to locate the boundaries and alignment of the regulated activities and the geologic or manmade features noted in the Geologic Assessment.

Survey staking will be completed by this date: 2/20/2023

14. **Attachment C – Project Description.** Attached at the end of this form is a detailed narrative description of the proposed project. 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

15. 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/Uncleared)
- Other: _____

Prohibited Activities

16. I am aware that the following activities are prohibited on the Recharge Zone and are not proposed for this project:

- (1) Waste disposal wells regulated under 30 TAC Chapter 331 of this title (relating to Underground Injection Control);
- (2) New feedlot/concentrated animal feeding operations, as defined in 30 TAC §213.3;
- (3) Land disposal of Class I wastes, as defined in 30 TAC §335.1;
- (4) The use of sewage holding tanks as parts of organized collection systems; and
- (5) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41(b), (c), and (d) of this title (relating to Types of Municipal Solid Waste Facilities).
- (6) New municipal and industrial wastewater discharges into or adjacent to water in the state that would create additional pollutant loading.

17. I am aware that the following activities are prohibited on the Transition Zone and are not proposed for this project:

- (1) Waste disposal wells regulated under 30 TAC Chapter 331 (relating to Underground Injection Control);
- (2) Land disposal of Class I wastes, as defined in 30 TAC §335.1; and

- (3) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41 (b), (c), and (d) of this title.

Administrative Information

18. The fee for the plan(s) is based on:

- For a Water Pollution Abatement Plan or Modification, the total acreage of the site where regulated activities will occur.
 - For an Organized Sewage Collection System Plan or Modification, the total linear footage of all collection system lines.
 - For a UST Facility Plan or Modification or an AST Facility Plan or Modification, the total number of tanks or piping systems.
 - A request for an exception to any substantive portion of the regulations related to the protection of water quality.
 - A request for an extension to a previously approved plan.
19. Application fees are due and payable at the time the application is filed. If the correct fee is not submitted, the TCEQ is not required to consider the application until the correct fee is submitted. Both the fee and the Edwards Aquifer Fee Form have been sent to the Commission's:
- TCEQ cashier
 - Austin Regional Office (for projects in Hays, Travis, and Williamson Counties)
 - San Antonio Regional Office (for projects in Bexar, Comal, Kinney, Medina, and Uvalde Counties)
20. 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. The copies must be submitted to the appropriate regional office.
21. No person shall commence any regulated activity until the Edwards Aquifer Protection Plan(s) for the activity has been filed with and approved by the Executive Director.

Central Texas Stone & Aggregate, LLC
Chalk Ridge Shop

Project Description

Central Texas Stone and Aggregate, LLC is proposing to build a vehicle maintenance shop, fuel island (Near 601 County Road 239 and Highway 195, on their plot of 9.17 acres in Williamson County). This site is located over the Edwards Aquifer Recharge Zone. Regulated activity on the site may include maintenance on the vehicles inside the shop and the operation of fuel tanks located on a concrete pad on site.

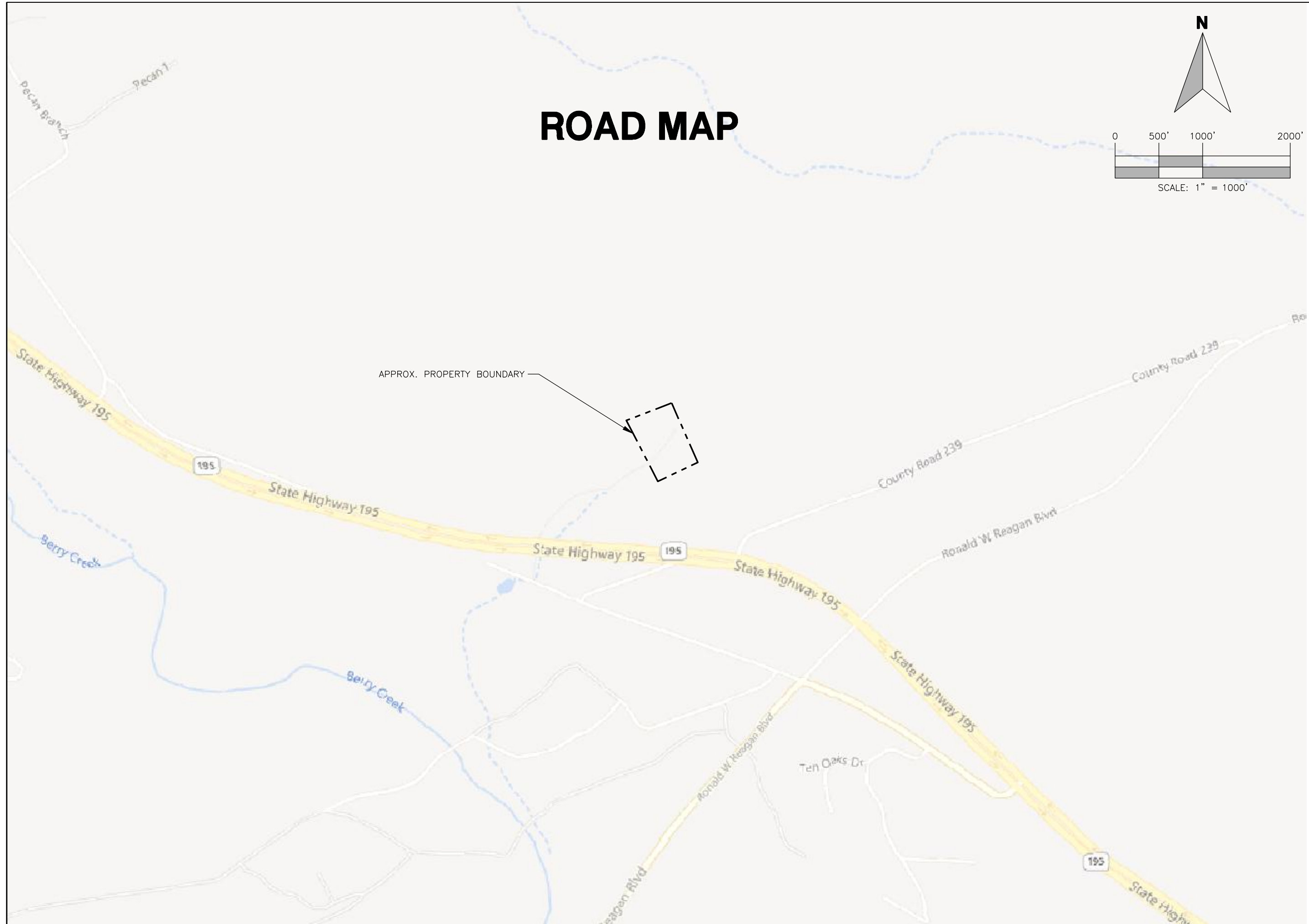
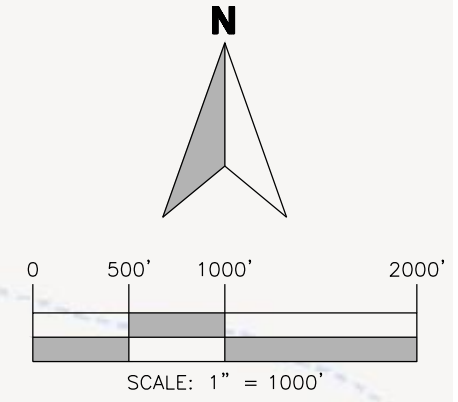
The new impervious cover will be from the addition of a Maintenance Shop Building, a fuel storage island, and adjacent compacted base. The site pad may be paved in the future.

The proposed fuel tanks that will be added are (3) 12,000-gallon double-walled steel tanks. These tanks will be stored on a concrete pad with a 3-inch rounded curb and a sump for collection of minor spills or leaks. The pad will have a drive through filling station and compacted base area for truck to drive and fill on as shown in the site map.

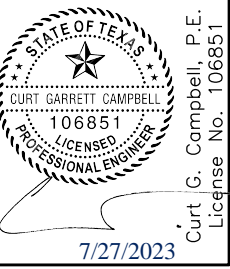
A detention pond used in conjunction with a grassy swale for treatment of the site pad and tank containment areas. There will also be an earthen berm and earthen swale to direct stormwater into the sediment forebay for initial treatment.

A GA was performed on the parent tract for this property (approx. 60 acres). No features were identified on the subject 9.17 acres proposed to be covered by this plan. A copy of the GA performed on June 1, 2021 is included below with this application. On site trash and debris will be treated with a licensed waste management service.

ROAD MAP



WESTWARD
 Environmental Engineering, Natural Resources,
 P.O. Box 2205 Boerne, Texas 78006
 (830) 249-8284 Fax: (830) 249-0221
 TBPE REG. NO.: F-4524



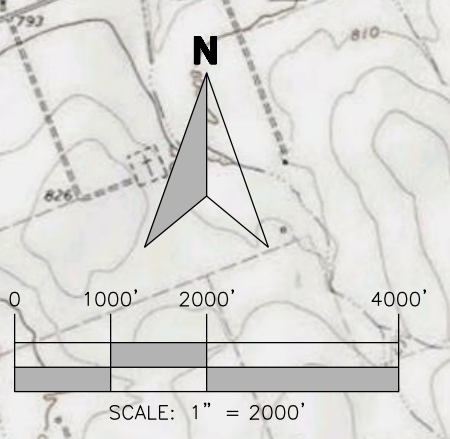
ROAD MAP

CTSA WPAP & AST
 CENTRAL TEXAS STONE AND AGGREGATE, LLC
 601 County Road 239, Florence, TX, 76257

REV.	DESCRIPTION	BY	DATE

ISSUE DATE:	04/21/2023
DRAWN BY:	MRM
CHECKED BY:	CGC
SCALE:	1" = 1000'
JOB NO.:	10500-039

USGS/EDWARDS MAP



CONTRIBUTING ZONE

RECHARGE ZONE

APPROX. PROPERTY BOUNDARY

FLOW PATH OFF-SITE

IMAGE:

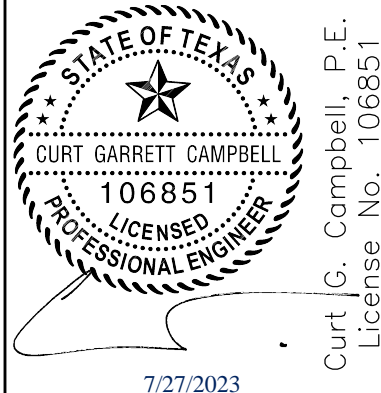
ISSUE DATE:	04/20/2023
DRAWN BY:	MRM
CHECKED BY:	CGG
SCALE:	1" = 2000'
JOB NO.:	10500-039

SHEET NO.:

1
OF 1

WESTWARD
Environmental Engineering, Natural Resources
P.O. Box 2205 Boerne, Texas 78006
(830) 249-8284 Fax: (830) 249-0221
TBPB REG. NO.: F-4524
TBPB REG. NO.: 50112

REV.	DESCRIPTION	DATE



7/27/2023

USGS/EDWARDS MAP
CTSA WPAP & AST
CENTRAL TEXAS STONE AND AGGREGATE, LLC
601 COUNTY ROAD 239, FLORENCE, TX

Geologic Assessment

Texas Commission on Environmental Quality

For Regulated Activities on The Edwards Aquifer Recharge/transition Zones and Relating to 30 TAC §213.5(b)(3), 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. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Print Name of Geologist:

Telephone: 830-249-8284

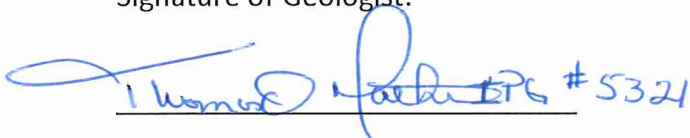
Thomas O. Mathews, PG #5321

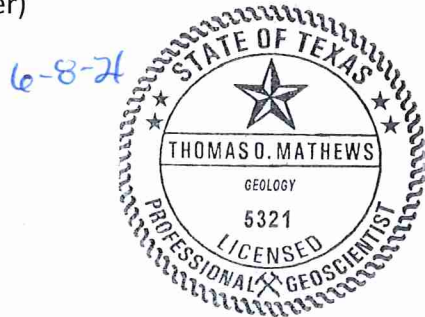
Fax: 830-249-0221

Date: 6/04/2021

Representing: Westward Environmental, Inc., TBPG Registered Geoscience Firm 50012 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:





Regulated Entity Name: 60-Acre Florence Tract

Project Information

1. Date(s) Geologic Assessment was performed: June 1, 2021

2. Type of Project:

WPAP

AST

SCS

UST

3. Location of Project:

Recharge Zone

Transition Zone

Contributing Zone within the Transition Zone

4. **Attachment A - Geologic Assessment Table.** Completed Geologic Assessment Table (Form TCEQ-0585-Table) is attached.
5. Soil cover on the project site is summarized in the table below and uses the SCS Hydrologic Soil Groups* (Urban Hydrology for Small Watersheds, Technical Release No. 55, Appendix A, Soil Conservation Service, 1986). If there is more than one soil type on the project site, show each soil type on the site Geologic Map or a separate soils map.

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness(feet)
EeB	D	< 2
ErE	D	< 2
GeB	D	< 4
GsB	D	< 4

* Soil Group Definitions (Abbreviated)

- A. Soils having a high infiltration rate when thoroughly wetted.
- B. Soils having a moderate infiltration rate when thoroughly wetted.
- C. Soils having a slow infiltration rate when thoroughly wetted.
- D. Soils having a very slow infiltration rate when thoroughly wetted.

6. **Attachment B – Stratigraphic Column.** A stratigraphic column showing formations, members, and thicknesses is attached. The outcropping unit, if present, should be at the top of the stratigraphic column. Otherwise, the uppermost unit should be at the top of the stratigraphic column.
7. **Attachment C – Site Geology.** A narrative description of the site specific geology including any features identified in the Geologic Assessment Table, a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure(s), and karst characteristics is attached.
8. **Attachment D – Site Geologic Map(s).** The Site Geologic Map must be the same scale as the applicant's Site Plan. The minimum scale is 1": 400'

Applicant's Site Plan Scale: 1" = N/A'

Site Geologic Map Scale: 1" = 100'

Site Soils Map Scale (if more than 1 soil type): 1" = 100'

9. Method of collecting positional data:

Global Positioning System (GPS) technology.

Other method(s). Please describe method of data collection: _____

10. The project site and boundaries are clearly shown and labeled on the Site Geologic Map.
11. Surface geologic units are shown and labeled on the Site Geologic Map.

12. Geologic or manmade features were discovered on the project site during the field investigation. They are shown and labeled on the Site Geologic Map and are described in the attached Geologic Assessment Table.
- Geologic or manmade features were not discovered on the project site during the field investigation.
13. The Recharge Zone boundary is shown and labeled, if appropriate.
14. All known wells (test holes, water, oil, unplugged, capped and/or abandoned, etc.): If applicable, the information must agree with Item No. 20 of the WPAP Application Section.
- There are 2 (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.)
- The wells are not in use and have been properly abandoned.
- The wells are not in use and will be properly abandoned.
- The wells are in use and comply with 16 TAC Chapter 76.
- There are no wells or test holes of any kind known to exist on the project site.

Administrative Information

15. 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. The copies must be submitted to the appropriate regional office.

CENTRAL TEXAS STONE & AGGREGATE, LLC

GEOLOGIC ASSESSMENT

60-ACRE FLORENCE TRACT
STATE HWY 195 & CR 239
FLORENCE, TEXAS 76527
WILLIAMSON COUNTY

Submitted to: TCEQ Region 11, Austin

Prepared By:



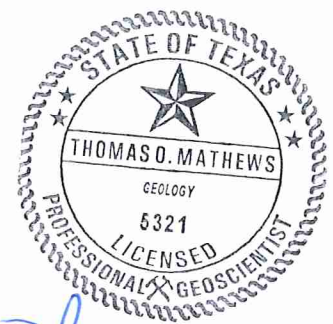
Boerne, Texas

830-249-8284

Date: June 2021

Project No. 10050-030

-JG-



Signature: 

Thomas O. Mathews II, PG - License No. 5321

TX PG Firm No. 50112

Date: 6-8-2021

Attachment A

Geologic Assessment Table (Form TCEQ-0585)

GEOLOGIC ASSESSMENT TABLE PROJECT NAME: **60-ACRE FLORENCE TRACT**

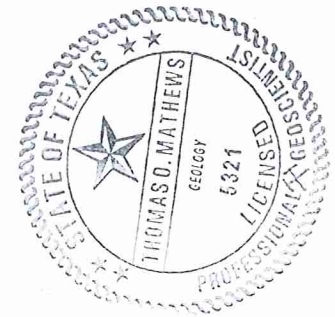
LOCATION			FEATURE CHARACTERISTICS										EVALUATION			PHYSICAL SETTING	
1A	1B*	1C*	2A	2B	3	4			5	6	7	8A	8B	9	10	11	12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY	CATCHMENT AREA (ACRES)	TOPOGRAPHY
						X	Y	Z		$\frac{D}{L}$					<40	<1.6	
CS-1	30.759641	-97.729759	SH	20	Kept	5	10	1.5	51	10		O		7	27	X	Hillside
CS-2	30.759929	97.729602	SH	20	Kept	4	4	2	23	10		O		7	37	X	Hillside
CS-3	30.759918	97.729561	SH	20	Kept	5	5	1.5	23	10		O		7	37	X	Hillside
CS-4	30.760104	97.729541	SH	20	Kept	3	6	1.5	31	10		O		7	37	X	Hillside
CS-5	30.759854	97.728535	CD	5	Kept	30	40	1	N/A			X		5	10	X	Hillside
CS-6	30.760058	97.728604	CD	5	Kept	30	40	0.75	N/A			N		5	10	X	Hillside
CS-7(A)	30.760389	-97.7287	CD	5	Kgt	40	100	3	N/A			X		5	10	X	Hillside
CS-7(B)	30.760389	-97.7287	CD	5	Kgt	25	35	1.5	N/A			X		5	10	X	Hillside
CS-8	30.759689	97.728192	CD	5	Kgt	30	70	1	N/A			X,N		5	10	X	Hillside
CS-9	30.759931	97.727250	CD	5	Kgt	6	20	1	N/A			C,X		25	30	X	Hillside
CS-10	30.760466	97.722553	MB	30	Kgt	0.67	unknown		N/A			X		5	35	X	Hillside
CS-11	30.760082	97.724053	MB	30	Kgt	1		8	N/A			X		5	35	X	Hillside

* DATUM: NAD 83

2A TYPE	TYPE	2B POINTS
C	Cave	30
SC	Solution cavity	20
SF	Solution-enlarged fracture(s)	20
F	Fault	20
O	Other natural bedrock features	5
MB	Manmade feature in bedrock	30
SW	Swallow hole	30
SH	Sinkhole	20
CD	Non-karst closed depression	5
Z	Zone, clustered or aligned features	30

- 8A INFILLING
- N None, exposed bedrock
 - C Coarse - cobbles, breakdown, sand, gravel
 - O Loose or soft mud or soil, organics, leaves, sticks, dark colors
 - F Fines, compacted clay-rich sediment, soil profile, gray or red colors
 - V Vegetation. Give details in narrative description
 - FS Flowstone, cements, cave deposits
 - X Other materials

- 12 TOPOGRAPHY
- Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed



I have read, understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The information presented here complies with that document and is a true representation of the conditions observed in the field. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Thomas S. Mathews

6-9-21
Date

Attachment B

Stratigraphic Column

Generalized Stratigraphic Column – Williamson County, Texas

System	Group	Formation	Member	Thickness (feet)	Lithology	Field Identification	Cavern Development	Porosity/ permeability type
Upper Cretaceous		Austin Group (Kau)		225-350	Buff to white chalk; limestone and marl	White, light-gray limestone	Rare	Low porosity / low permeability
		Eagle Ford Group (Kef)		30-50	Brown, flaggy shale and argillaceous limestone	Thin flagstone; petroliferous odor	None	Low porosity / low permeability
		Buda Limestone (Kbu)		40-50	Buff, light-gray, dense mudstone	Porcelaneous limestone with calcite-filled veins	Minor surface karst	Low porosity / low permeability
		Del Rio Clay (Kdr)		40-50	Blue-green to yellow-brown clay	Fossiliferous; <i>lymatogyra arletna</i>	None	None/primary upper confining unit
Lower Cretaceous		Georgetown Formation (Kgt)		2-20	Reddish-brown, gray to light-tan, marly limestone	Marker fossil; <i>Waconeta waconensis</i>	None	Low porosity / low permeability
	Edwards Group (Ked)	Person Formation (Kep)	Cyclic and marine members undivided	80-90	Mudstone to packstone; <i>miloid</i> grainstone; chert	Thin graded cycles; massive beds to relatively thin beds; crossbeds	Many subsurface; might be associated with earlier karst development	Laterally extensive; both fabric and not fabric / water yielding
			Leached and collapsed members, undivided	70-90	Crystalline limestone; mudstone to grainstone; chert; collapsed breccia	Biolubated iron-stained beds separated by massive limestone beds; stromatolitic limestone	Extensive lateral development; large rooms	Majority not fabric / one of the most porous and permeable
			Regional dense member	20-24	Dense argillaceous mudstone	Wispy iron-oxide stains	Very few; only vertical fracture enlargement	Not fabric / low permeability; vertical barrier
	Kainer Formation (Kek)	Grainstone member	50-60	<i>Miloid</i> grainstone; mudstone to wackestone; chert	White cross-bedded grainstone	Few	Not fabric / recrystallization reduces permeability	
		Kirschberg evaporite member	50-60	Highly altered crystalline limestone; chalky mudstone; chert	Boxwork voids, with neospar and travertine frame	Probably extensive cave development	Majority fabric / one of the most porous and permeable	
		Dolomitic member	110-130	Mudstone to grainstone; crystalline limestone; chert	Massively bedded, light gray <i>Toucasia</i> abundant	Caves related to structure or bedding planes	Mostly not fabric; some bedding-plane fabric / water-yielding	
		Basal nodular member	50-60	Shaly, nodular limestone; mudstone and <i>miloid</i> grainstone	Massive, nodular and mottled, <i>Exogyra texana</i>	Large lateral caves at surface; a few caves near Cibolo Creek	Fabric; stratigraphically controlled / large conduit flow at surface; no permeability in subsurface	
		Upper member of the Glen Rose Limestone (Kgru)		350-500	Yellowish tan, thinly bedded limestone and marl	Stair-step topography; alternating limestone and marl	Some surface cave development	Some water production at evaporite beds / relatively impermeable

Surface unit observed onsite during field reconnaissance

Adapted from Stein and Ozuna, 1996.

Attachment C

Site Geology (Geologic Narrative)

Geologic Narrative for Chalk Ridge Expansion in Williamson County, Texas.

1.0 PURPOSE

Westward Environmental, Inc. (WESTWARD) was retained by Central Texas Stone & Aggregate, LLC (Client) to prepare a Geologic Assessment (GA) of their 60-acre tract (Site) located adjacent to the southwest of Chalk Ridge Quarry in Florence, Williamson County, Texas. This GA was prepared as a required attachment to a Water Pollution Abatement Plan (WPAP) application for the Site as required by the Texas Commission of Environmental Quality (TCEQ).

2.0 REGULATORY GUIDANCE

Chapter 30 of the Texas Administrative Code

This report was prepared in accordance with *Instructions for Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones (TCEQ-0585 (Rev. 10-01-04))* and will be reviewed pursuant to Title 30, Chapter 213 of the Texas Administrative Code.

3.0 PROJECT LOCATION

The Site is located along State Highway 195 and County Road 239 in Florence, Williamson County Texas and sits just southwest of the existing Chalk Ridge Quarry at 601 CR 239. The Site is located over the Edwards Aquifer Recharge Zone (EARZ).

4.0 METHODOLOGY

As part of the GA, WESTWARD geologists performed a desktop review of selected published information. WESTWARD also conducted a field investigation in accordance with *(TCEQ-0585 (Rev. 10-01-04))*.

4.1 Desktop Review

WESTWARD geologists conducted a review of aerial imagery, the University of Texas Bureau of Economic Geology (BEG) Geologic Atlas of Texas (GAT) Austin Sheet, applicable U.S. Geological Survey (USGS) Topographic quadrangle(s), the Texas Natural Resources Information System (TNRIS), the Texas Water Development Board's (TWDB) Water Data Interactive Groundwater Data Viewer, the Railroad Commission of Texas (RRC), and the U.S. Department of Agriculture (USDA) National Resource Conservation Service (NRCS) Web Soil Survey prior to the field investigation.

4.2 Field Investigation

A field investigation was performed at the Site by Thomas O. Mathews, P.G. (TBPG Lic. No.: 5321) on June 1, 2021. Field transects of the Site were walked in accordance with TCEQ-0585 (rev. 10-01-04).

5.0 DESKTOP REVIEW

The desktop review was utilized for preliminary planning of the field investigation. The accuracy of the desktop review was limited by the accessibility, scale, and age of the data available.

5.1 Published Surface Geology

A review of published geologic maps resulted in two (2) units mapped at the Site which include the Cretaceous-aged Edwards Limestone, Person Formation (Kep), and the Georgetown Formation (Kgt) (USGS, 2007).

5.2 Published Structure

The desktop review did not reveal published structure on the Site. For the purpose of this assessment, the dominant fault trend in this area was calculated by taking an average of the trends of the three nearest faults (20°, 30°, and 32°) that surround the Site. The average was calculated to be 27°.

5.3 Karst Features

The desktop review did not reveal any karst features on the Site.

5.4 Non-karst & Manmade Features

The desktop review did not reveal any non-karst or manmade features on the Site.

5.5 Soils

Four (4) soil units were identified on the Site through the NRCS Web Soil Survey. It is detailed below as well as included on the Geologic Assessment Form TCEQ-0585 (Rev. 02-11-15).

Published Soil Unit Descriptions			
<i>Soil Name</i>	<i>Group</i>	<i>Thickness (Feet)</i>	<i>Description</i>
Eckrant stony clay (EeB), 0 to 3 percent slopes, stony	D	< 2	4-20 inches to bedrock, well drained, moderately low to moderately high (0.06 to 0.57 in/hr) Ksat capacity
Eckrant-Rock outcrop association (ErE), 1 to 10 percent slopes	D	< 2	4-20 inches to bedrock, well drained, moderately low to moderately high (0.06 to 0.57 in/hr) Ksat capacity
Georgetown clay loam (GeB), 0 to 2 percent slopes	D	< 4	20-40 inches to bedrock, well drained, very low to moderately low (0.00 to 0.06 in/hr) Ksat capacity
Georgetown stony clay loam (GsB), 1 to 3 percent slopes	D	< 4	20 to 40 inches to bedrock, well drained, very low to moderately low (0.00 to 0.06 in/hr) Ksat capacity

6.0 FIELD INVESTIGATION

The field investigation was performed on June 1, 2021 to verify the presence or absence of recharge features identified in the desktop review and identify recharge features not found during the desktop review. Field reconnaissance was performed in accordance with the (TCEQ-0585-Instructions (Rev. 10-1-04)).

6.1 Surface Geology

The Site is located on the Cretaceous-aged Edwards Limestone, Person Formation (Kep) and the Georgetown Formation (Kgt). An Area Geology Map is included (Attachment D).

6.2 Structure

No evidence of faults or other structure were observed on the Site during the field investigation.

6.3 Karst Features

Four (4) sinkholes, and one (1) closed depression were identified during the field investigation. None of these features are rated as sensitive.

6.4 Non-karst & Manmade Features

Five (5) non-karst closed depressions and two (2) manmade features in bedrock were identified during the field investigation. None of these features are rated as sensitive.

6.5 Feature Descriptions

CS-1 (SH)

Not Sensitive

Feature CS-1 is a rock-rimmed sinkhole located approximately 20 ft. inside the fence along Highway 195. The feature measures approximately 5 ft. x 10 ft. x 1.5 ft. with an approximate bearing of 51°. It was plugged with soil and organics at the time of field reconnaissance and there was little to no evidence of flow after a recent rain event. The catchment area is less than 1.6 acres, and the interpreted probability of rapid infiltration is low. This feature is rated not sensitive.

CS-2 (SH)

Not Sensitive

Feature CS-2 is a small sinkhole with approximate dimensions of 4 ft. x 4 ft. x 2 ft. and an approximate bearing of 23°. The feature appeared to be previously excavated and was plugged with soil and leaves at the time of field reconnaissance. There was no evidence of flow. The catchment area is less than 1.6 acres, and the interpreted probability of rapid infiltration is low. The feature is rated not sensitive.

CS-3 (SH)

Not Sensitive

Feature CS-3 is another small sinkhole located adjacent to feature S-2. It has approximate dimensions of 5 ft. x 5 ft. x 1.5 ft. and a bearing of 23° from S-2. This feature also appears to have been previously excavated and was plugged with organics at the time of field reconnaissance. There was no evidence of flow. The catchment area for this feature is less than 1.6 acres and the interpreted probability of rapid infiltration is low. This feature is rated not sensitive.

CS-4 (SH)

Not Sensitive

Feature CS-4 is a very small sinkhole with approximate dimensions of 3 ft. x 6 ft. x 1.5 ft. and a bearing of 31°. This feature also appears to have been previously excavated and was plugged with organics at the time of field reconnaissance. There was no evidence of flow. The catchment area for this feature is less than 1.6 acres and the interpreted probability of rapid infiltration is low. This feature is rated not sensitive.

CS-5 (CD)

Not Sensitive

Feature CS-5 is a non-karst closed depression that measures approximately 30 ft. x 40 ft. x 1 ft. and appears to have been a result of land clearing. The bottom consists of bedrock and was ponding water at the time of field reconnaissance. The catchment area for this feature is less than 1.6 acres and the interpreted probability of rapid infiltration is low. This feature is rated not sensitive.

CS-6 (CD)

Not Sensitive

Feature CS-6 is a non-karst closed depression that measures approximately 30 ft. x 40 ft. x 0.75 ft. and appears to have been a result of land clearing. The bottom consists of bedrock and also had ponded water at the time of field reconnaissance. The catchment area for this feature is less than 1.6 acres and the interpreted probability of rapid infiltration is low. This feature is rated not sensitive.

CS-7 (CD)

Not Sensitive

Feature CS-7 is a pair of non-karst closed depressions that appeared to be created by surface mining of building stone. CS-7(A) measures approximately 40 ft. x 100 ft. x 3 ft and has a catchment area greater than 1.6 acres. CS-7(B) measures approximately 25 ft. x 35 ft. x 1.5 ft. with a catchment area of less than 1.6 acres. Both had ponded water at the time of field reconnaissance and the interpreted probability of rapid infiltration is low. This feature is rated not sensitive.

CS-8 (CD)

Not Sensitive

Feature CS-8 is a non-karst closed depression that appears to be the result of previous excavation. It is located adjacent to the southern property line along Highway 195. The feature measures approximately 30 ft. x 70 ft. x 1 ft. The bottom of this feature consists of bedrock and was ponding water at the time of field reconnaissance. The catchment area for this feature is greater than 1.6 acres and the interpreted probability of rapid infiltration is low. This feature is rated not sensitive.

CS-9 (CD)

Not Sensitive

Feature CS-9 is a closed depression that measures approximately 6 ft. x 20 ft. x 1 ft. The feature was filled with coarse rocks and a metal pipe at the time of field reconnaissance. It appears that this feature is in an area of disturbance. The catchment area for this feature is less than 1.6 acres and the interpreted probability of rapid infiltration is intermediate. This feature is rated not sensitive.

CS-10 (MB)

Not Sensitive

Feature CS-10 is a well located on the southeast corner of the property near County Road 239 and adjacent to an internal road that delineates the eastern property line. The casing

measures approximately 0.67 ft. in diameter and is elevated about 20 inches above a concrete slab. The well is in operation and in compliance. The catchment area for this feature is less than 1.6 acres and the interpreted probability of rapid infiltration is low. This feature is rated not sensitive.

CS-11 (MB)

Not Sensitive

Feature CS-11 is a historical well that appears to have been hand dug and has stone and mortar walls. The well is in good condition. It is located near the southern property boundary along County Road 239. The feature has an opening that is elevated approximately 2 ft. from the surface. The opening measures approximately 1 ft. in diameter. At the time of field reconnaissance, the bottom of the well was filled with trash. There was no water inside the feature despite the fact that it had rained ~3.5 inches the day before. The catchment area for this feature is less than 1.6 acres and the interpreted probability of rapid infiltration is low. This feature is rated not sensitive.

7.0 REFERENCES

Bureau of Economic Geology, 1992, Geologic Map of Texas: University of Texas at Austin, Virgil E. Barnes, project supervisor, Hartmann, B.M. and Scranton, D.F., cartography, scale 1:500,000.

Stoeser, D.B., Shock, Nancy, Green, G.N., Dumonceaux, G. M., and Heran, W.D., in press, A Digital Geologic Map Database for the State of Texas: U.S. Geological Survey Data Series.

United States Geological Survey, et.al, 2007. Geologic Database of Texas Viewer

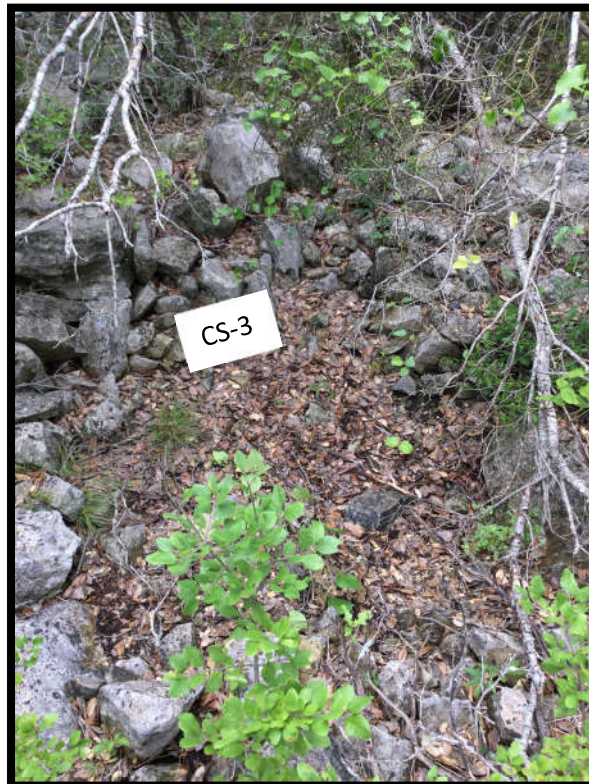
Accessed: March 16, 2021

<https://txpub.usgs.gov/txgeology/>

SELECT PHOTOGRAPHS



Feature CS-1: Sinkhole.



Feature CS-3: Sinkhole.



Feature CS-6: Sinkhole.



Feature CS-6: Closed depression with ponded water.



Feature CS-7: Closed depression with ponded water.



Feature CS-9: Closed depression with metal pipe.



Feature CS-310: Motorized well.



Feature CS-11: Historic well.

Attachment D

**Site Geologic Map
Site Soils Map**

LEGEND

60-Acre Florence Tract

GA Features

Published Geology

Kep - Edwards Limestone, Person Formation

Kgt - Georgetown Formation

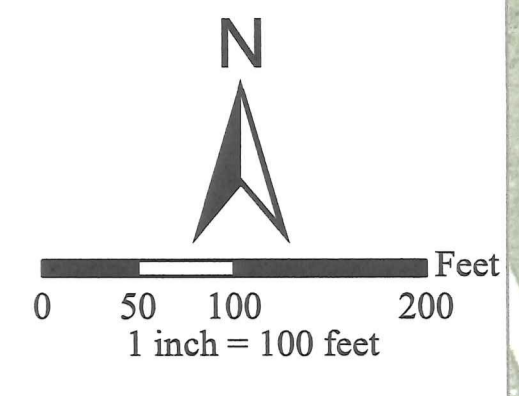


IMAGE: ESRI WORLD IMAGERY

ISSUE DATE: 06/03/2021

DRAWN BY: JG

CHECKED BY: T2

SCALE: 1" = 100'

JOB NO.: 10500-030

SHEET NO.:

01

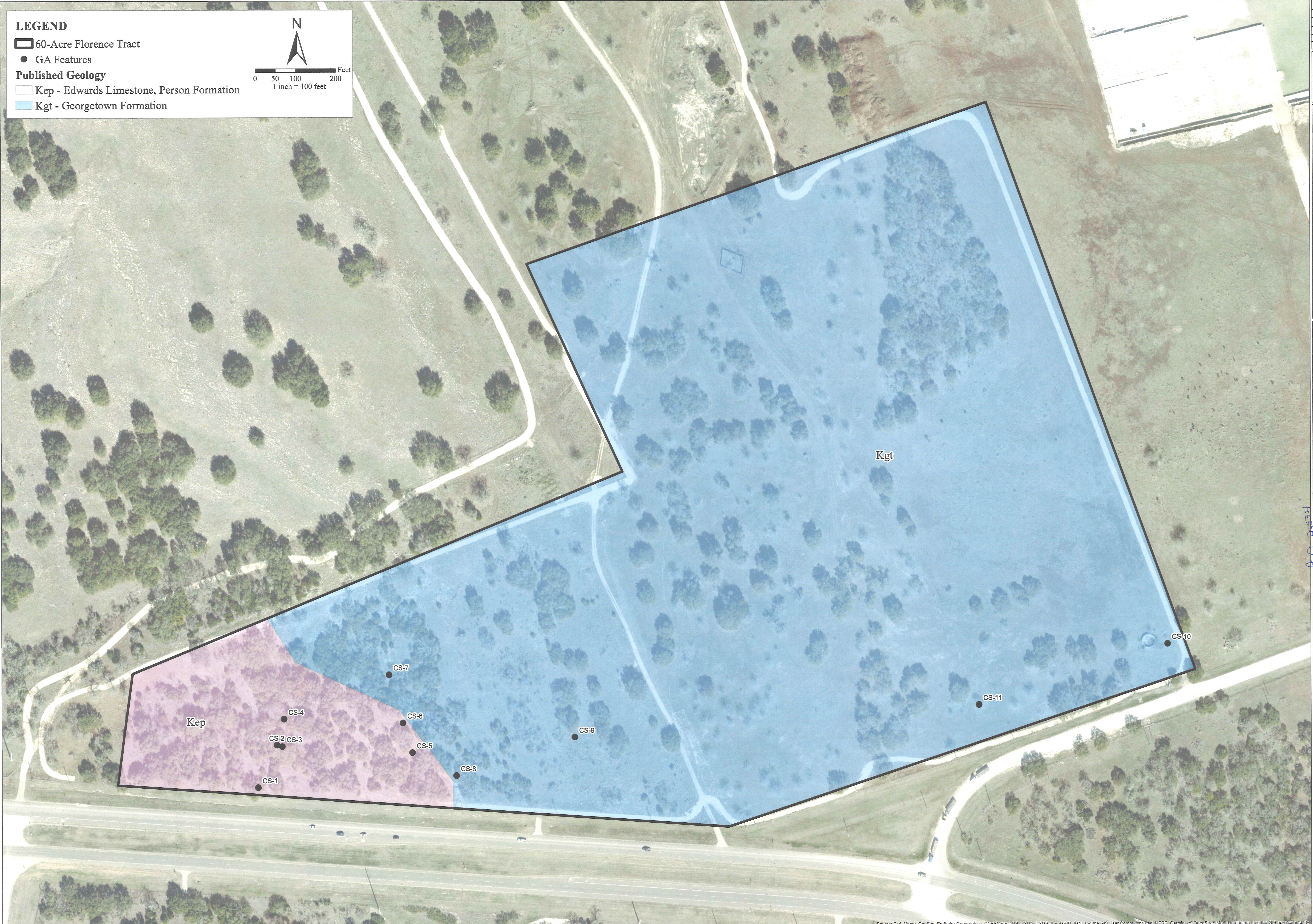
OF 02

WESTWARD
 Environmental, Engineering, Natural Resources,
 P.O. Box 2205, Boerne, Texas 78006
 (830) 249-8284 Fax: (830) 249-0221
 TBPE REG. NO.: F-4524
 TBPG REG. NO.: 50112

REV	DESCRIPTION	BY	DATE



SITE GEOLOGIC MAP
 60-ACRE FLORENCE TRACT
 CENTRAL TEXAS STONE & AGGREGATE, LLC
 FLORENCE, WILLIAMSON COUNTY, TEXAS



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS User Community


LEGEND

- 60-Acre Florence Tract
- GA Features

Published Soils

- EeB - Eckrant stony clay
- ErE - Eckrant-Rock outcrop association
- GeB - Georgetown clay loam
- GsB - Georgetown stony clay loam

N



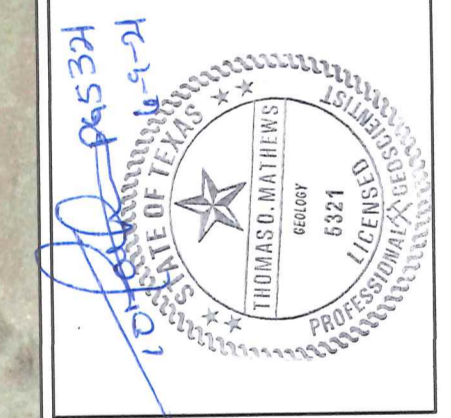
0 50 100 200 Feet

1 inch = 100 feet



WESTWARD
 Environmental, Engineering, Natural Resources,
 P.O. Box 2205, Boerne, Texas 78006
 (830) 249-8284 Fax: (830) 249-0221
 TBP REG. NO.: F-4524
 TBP REG. NO.: 30112

REV	DESCRIPTION	BY	DATE



SITE SOILS MAP
 60-ACRE FLORENCE TRACT
 CENTRAL TEXAS STONE & AGGREGATE, LLC
 FLORENCE, WILLIAMSON COUNTY, TEXAS

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS User Community

Water Pollution Abatement Plan Application

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b), 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 **Water Pollution Abatement Plan Application Form** is hereby submitted for TCEQ review and Executive Director approval. The form was prepared by:

Print Name of Customer/Agent: Curt G. Campbell, PE - TX License No. 106851, TX Firm No. 4524

Date: 7/27/2023

Signature of Customer/Agent:




Regulated Entity Name: Chalk Ridge Shop

Regulated Entity Information

1. The type of project is:

- Residential: Number of Lots: _____
- Residential: Number of Living Unit Equivalents: _____
- Commercial
- Industrial
- Other: _____

2. Total site acreage (size of property): 9.17

3. Estimated projected population: 10

4. The amount and type of impervious cover expected after construction are shown below:

Table 1 - Impervious Cover Table

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	26,000	÷ 43,560 =	0.60
Parking		÷ 43,560 =	
Other paved surfaces	139,352	÷ 43,560 =	3.2
Total Impervious Cover	165,352	÷ 43,560 =	3.8

Total Impervious Cover 3.8 ÷ Total Acreage 9.17 X 100 = 41.44% Impervious Cover

5. **Attachment A - Factors Affecting Surface Water Quality.** A detailed description of all factors that could affect surface water and groundwater quality that addresses ultimate land use is attached.
6. Only inert materials as defined by 30 TAC §330.2 will be used as fill material.

For Road Projects Only

Complete questions 7 - 12 if this application is exclusively for a road project.

7. 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.

8. Type of pavement or road surface to be used:

- Concrete
- Asphaltic concrete pavement
- Other: _____

9. Length of Right of Way (R.O.W.): _____ feet.

Width of R.O.W.: _____ feet.

L x W = _____ Ft² ÷ 43,560 Ft²/Acre = _____ acres.

10. Length of pavement area: _____ feet.

Width of pavement area: _____ feet.

L x W = _____ Ft² ÷ 43,560 Ft²/Acre = _____ acres.

Pavement area _____ acres ÷ R.O.W. area _____ acres x 100 = _____ % impervious cover.

11. A rest stop will be included in this project.
- A rest stop will not be included in this project.

12. 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

13. **Attachment B - 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 the 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

14. The character and volume of wastewater is shown below:

<u>100%</u> Domestic	<u>20</u> Gallons/day
<u> </u> % Industrial	<u> </u> Gallons/day
<u> </u> % Commingled	<u> </u> Gallons/day
TOTAL gallons/day <u>20</u>	

15. Wastewater will be disposed of by:

On-Site Sewage Facility (OSSF/Septic Tank):

Attachment C - 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):

Private service laterals from the wastewater generating facilities will be connected to an existing SCS.

Private service laterals from the wastewater generating facilities will be connected to a proposed SCS.

The SCS was previously submitted on _____.

The SCS was submitted with this application.

The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to Executive Director approval.

The sewage collection system will convey the wastewater to the _____ (name) Treatment Plant. The treatment facility is:

Existing.

Proposed.

16. All private service laterals will be inspected as required in 30 TAC §213.5.

Site Plan Requirements

Items 17 – 28 must be included on the Site Plan.

17. The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = 100'.

18. 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) sources(s): FEMA 48491C0125F, Effective 12/20/2019

19. 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, open space, etc. are shown on the plan.

The layout of the development is shown with existing contours at appropriate, but not greater than ten-foot intervals. Finished topographic contours will not differ from the existing topographic configuration and are not shown. Lots, recreation centers, buildings, roads, open space, etc. are shown on the site plan.

20. All known wells (oil, water, unplugged, capped and/or abandoned, test holes, etc.):

There are _____ (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply)

The wells are not in use and have been properly abandoned.

The wells are not in use and will be properly abandoned.

The wells are in use and comply with 16 TAC §76.

There are no wells or test holes of any kind known to exist on the project site.

21. Geologic or manmade features which are on the site:

All sensitive geologic or manmade features identified in the Geologic Assessment are shown and labeled.

No sensitive geologic or manmade features were identified in the Geologic Assessment.

Attachment D - Exception to the Required Geologic Assessment. A request and justification for an exception to a portion of the Geologic Assessment is attached.

Central Texas Stone & Aggregate, LLC
Chalk Ridge Shop

Water Pollution Abatement Plan Attachment A

Factors Affecting Surface Water Quality

The major factor that may affect water quality from the proposed development is the additional sediment in stormwater runoff from disturbed areas. Additional factors may include fuels and lubricants from vehicles and trash/debris.

Swales and an earthen berm will be used on site to divert stormwater flowing across the shop area into Pond A. There the water will be treated by the detention pond and swale in series with a sediment removal efficiency of 83.75% which meets the minimum additional TSS requirements in RG-348 of 80%. Any spills or leaks will be cleaned immediately and disposed of in the proper manner. A trash receptacle will be on site for both employees and potential visitors to use.

Water Pollution Abatement Plan Attachment B

Volume and Character of Stormwater

The total area being developed, as shown on the Site Map is 9.17 acres. The stormwater from this disturbed area is anticipated to carry an increased level of total suspended solids (TSS); however, this additional impervious cover will be treated with a BMP. The site has been divided through the use of a swale and berms as shown on the Site Map and there are two BMPs in series that will be used to treat stormwater. DA-001 is proposed to have 3.8 acres of added impervious cover, and the additional TSS will be treated through the use of Pond A in series with a 125-foot grassy swale. The treatment volume, or water quality volume (WQV), was determined using the RG-348 spreadsheet provided by TCEQ. Refer to the drainage report below for the WQVs used to size the proposed pond.

Due to the use of Temporary BMPs during construction, the character of stormwater runoff from the site will be nearly the same as prior to construction. The runoff coefficient for the impervious areas is 0.9 and the pre-development coefficient used was 0.03 per TCEQ guidance. The annual storm was used to determine the expected levels of TSS and the required WQVs that will need to be treated per RG-348. For the proposed stormwater pond, the WQV was determined to be 0.6 ac-ft. The pond in series with the grassy swale will provide for Maintenance Shop and AST areas required 80% TSS removal.

Article I. Aboveground Storage Tank Facility Plan Application

Texas Commission on Environmental Quality

For Permanent Storage on The Edwards Aquifer Recharge and Transition Zones And Relating to 30 TAC §213.5(e), 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.

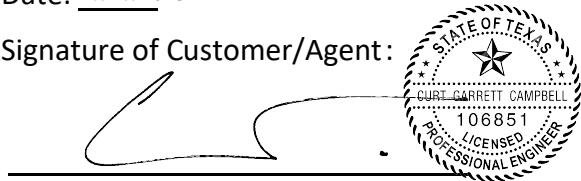
Section 1.01 Signature

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 **Aboveground Storage Tank Facility Plan Application** is hereby submitted for TCEQ review and Executive Director approval. The application was prepared by:

Print Name of Customer/Agent: Curt G. Campbell, PE - TX License No. 106851, TX Firm No. 4524

Date: 7/27/2023

Signature of Customer/Agent:



Regulated Entity Name: Chalk Ridge Shop

Section 1.02 Aboveground Storage Tank (AST) Facility Information

1. Tanks and substance stored:

Article II. Table 1 - Tank and Substance Storage

<i>AST Number</i>	<i>Size (Gallons)</i>	<i>Substance to be Stored</i>	<i>Tank Material</i>
1	12,000	Dyed Diesel	Double-Walled Steel
2	12,000	Dyed Diesel	Double-Walled Steel
3	12,000	Dyed Diesel	Double-Walled Steel

Total x 1.5 = _____ Gallons

2. 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 A - Alternative Methods of Secondary Containment.** Alternative methods for providing secondary containment are proposed. Specifications that show equivalent protection for the Edwards Aquifer are attached.

3. Inside dimensions and capacity of containment structure(s):

Article III. Table 2 - 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: N/A Gallons

4. 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
5. 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 Tanks are double-walled. Containment for piping, hoses, and dispensers is concrete.
6. **Attachment B - Scaled Drawing(s) of Containment Structure.** A scaled drawing of the containment structure that shows the following is attached:
- 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.

Section 3.01 Site Plan Requirements

Items 7 - 18 must be included on the Site Plan.

7. The Site Plan must have a minimum scale of 1" = 400'.
- Site Plan Scale: 1" = 80'.
8. 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) sources(s): 48491C0125F.
9. The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Show lots, recreation centers, buildings, roads, etc.
- The layout of the development is shown with existing contours. Finished topographic contours will not differ from the existing topographic configuration and are not shown.
10. All known wells (oil, water, unplugged, capped and/or abandoned, test holes, etc.):
- There are _____ (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply):
- The wells are not in use and have been properly abandoned.
- The wells are not in use and will be properly abandoned.
- The wells are in use and comply with 16 TAC § 76.
- There are no wells or test holes of any kind known to exist on the project site.
11. Geologic or manmade features which are on the site:
- All sensitive geologic or manmade features identified in the Geologic Assessment are shown and labeled.
- No sensitive geologic or manmade features were identified in the Geologic Assessment.
- Attachment C - Exception to the Geologic Assessment.** A request and justification for an exception to a portion of the Geologic Assessment is attached.
12. The drainage patterns and approximate slopes anticipated after major grading activities.
13. Areas of soil disturbance and areas which will not be disturbed.
14. Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.
15. Locations where soil stabilization practices are expected to occur.
16. Surface waters (including wetlands).
- N/A
17. Locations where stormwater discharges to surface water or sensitive features.
- There will be no discharges to surface water or sensitive features.

18. Legal boundaries of the site are shown.

Section 3.02 Best Management Practices

19. 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.

20. All stormwater accumulating inside the containment structure will be disposed of through an authorized waste disposal contractor.

Containment area will be covered by a roof.

Containment area will not be covered by a roof.

A description of the alternate method of stormwater disposal is submitted for the executive director's review and approval and is attached.

21. **Attachment D - Spill and Overfill Control.** A site-specific description of the methods to be used at the facility for spill and overfill control is attached.

22. **Attachment E - Response Actions to Spills.** A site-specific description of the planned response actions to spills that will take place at the facility is attached.

Section 3.03 Administrative Information

23. A Water Pollution Abatement Plan (WPAP) is required for construction of any associated commercial, industrial or residential project located on the Recharge Zone.

The WPAP application for this project was approved by letter dated _____. A copy of the approval letter is attached at the end of this application.

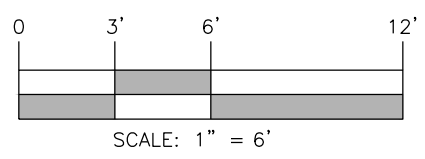
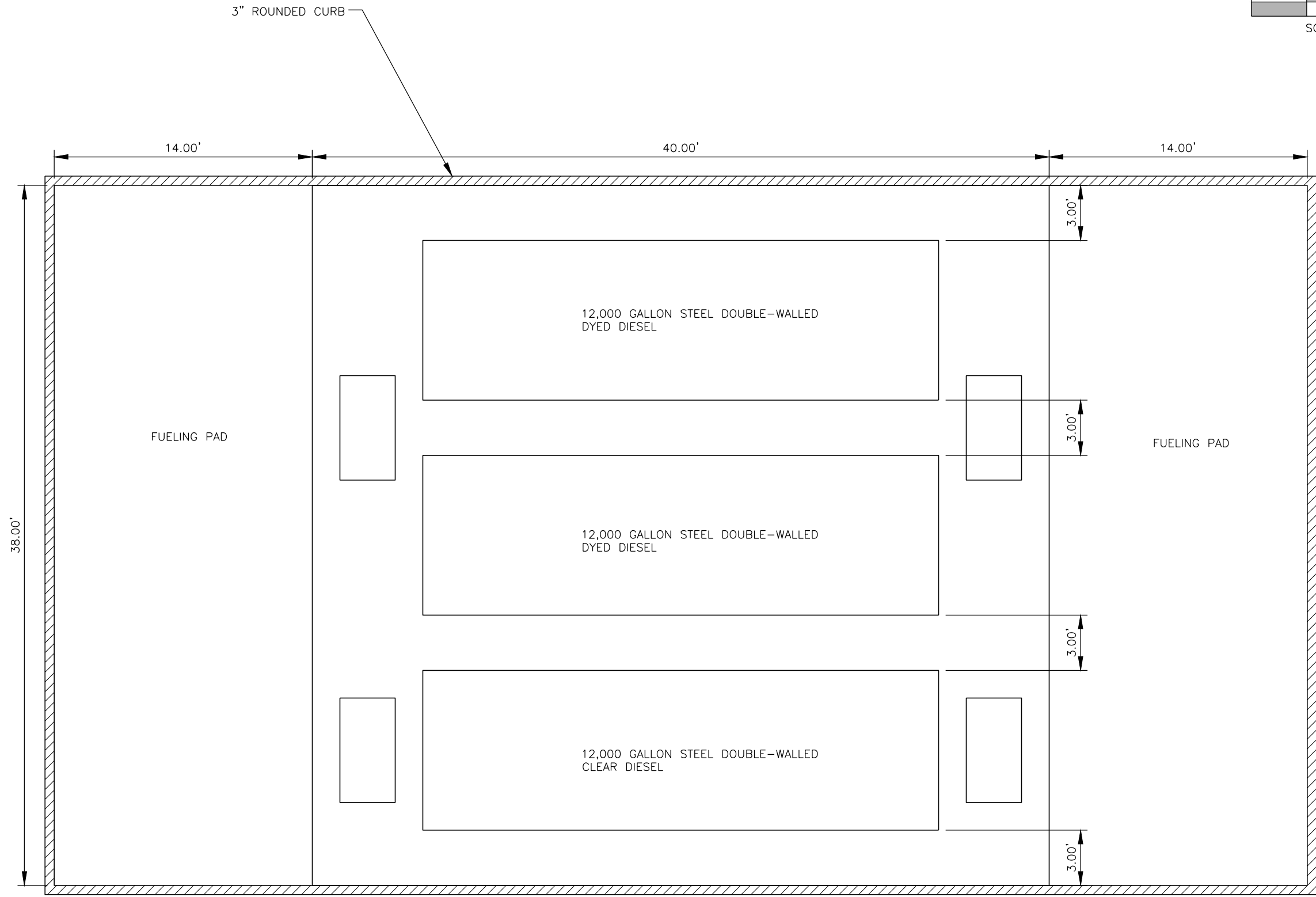
The WPAP application for this project was submitted to the TCEQ on concurrently, but has not been approved.

A WPAP application is required for an associated project, but it has not been submitted.

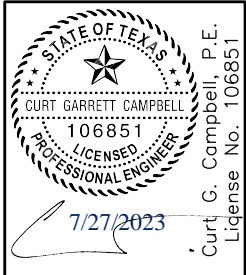
There will be no building or structure associated with this project. In the event a building or structure is needed in the future, the required WPAP will be submitted to the TCEQ.

The proposed AST is located on the Transition Zone and a WPAP is not required. Information requested in 30 TAC 213.5 subsection (b) (4)(B) and (C) and (5) is provided with this application. (Forms TCEQ-0600 Permanent Stormwater Section and TCEQ-0602 Temporary Stormwater Section or Stormwater Pollution Prevention Plan/SW3P).

24. This facility is subject to the requirements for the reporting and cleanup of surface spills and overfills pursuant to 30 TAC 334 Subchapter D relating to Release Reporting and Corrective Action.
25. 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. The copies must be submitted to the appropriate regional office.
26. Any modification of this AST Facility Plan application will require executive director approval, prior to construction, and may require submission of a revised application, with appropriate fees.



WESTWARD
 Environmental Engineering, Natural Resources,
 P.O. Box 2205 Boerne, Texas 78006
 (830) 249-8284 Fax: (830) 249-0221
 TBPE REG. NO.: F-4524



CONTAINMENT DRAWINGS
 CTSA AST & WPAP PLAN
 CENTRAL TEXAS STONE AND AGGREGATE, LLC
 601 COUNTY ROAD 239, FLORENCE, TX, 76257

REV.	DESCRIPTION	BY	DATE

ISSUE DATE:	02/01/2023
DRAWN BY:	MRM
CHECKED BY:	CGC
SCALE:	1" = 6'
JOB NO.:	10500-039

SHEET NO.:
1
 OF 1

Central Texas Stone & Aggregate, LLC
Chalk Ridge Shop
AST Attachment A

Alternate Methods to Secondary Containment

The three proposed diesel tanks will be double-walled steel tanks, which will be placed on a curbed concrete pad. Double-walled tanks are manufactured to provide secondary containment for their contents and these tanks will be fabricated per UL 2085 specifications. Tank specifications are unavailable to include with this application at this time because the tanks have not been ordered yet. Fill lines and dispensing lines will be plumbed to the top of the tanks to prevent free outward flow of the tank contents. Drainage from the interstices between the inner and outer tank will be prevented by a drain plug in the exterior tank. The three-inch height of the curb will provide approximately 646 cubic feet of impervious containment (approximately 4,832 gallons) to provide containment for associated piping, dispensers, hoses, nozzles, and potential drips. All piping will be aboveground and completely housed within the concrete rounded curb.

AST Attachment B

Scaled Drawing of Containment Structure

See attached containment drawings.

AST Attachment D

Spill and Overfill Control

Personnel in charge of loading/unloading tanks will be trained to utilize proper techniques and preventative measures to avoid spills. The tank levels will be checked prior to loading/unloading and the operator will be present at all times when the tank is loading/unloading.

The site will be subject to the Environmental Protection Agency's requirements as specified in 40 CFR part 112 regarding spills, prevention, control, and countermeasures (SPCC). The site will maintain an SPCC plan in accordance with applicable rules.

AST Attachment E

Spill Response Actions

Education

1. Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills. Employees should also be aware of when a spill must be reported to the TCEQ.
2. Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
3. Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular earthen meetings).
4. Establishing a continuing education program to indoctrinate new employees.

Central Texas Stone & Aggregate, LLC
Chalk Ridge Shop

5. Have a contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

1. To the extent that the work can be accomplished safely, spills of oil, petroleum products, and substances listed under 40 CFR parts 110.117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
2. Store hazardous materials and wastes in covered containers and protect from vandalism.
3. Place a stockpile of spill clean-up materials where it will be readily accessible.
4. Train employees in spill prevention and cleanup.
5. Designate responsible individuals to oversee and enforce control measures.
6. Spills should be covered and protected from stormwater run-on during rainfall to the extent that it doesn't compromise cleanup activities.
7. Do not bury or wash spills with water.
8. Store and dispose of used clean-up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
9. Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.
10. Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
11. Place Safety Data Sheets (SDS), as well as proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
12. Keep waste storage areas clean, well-organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

1. Clean up leaks and spills immediately.
2. Use a rag for small spills on paved surfaces. A damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.

Central Texas Stone & Aggregate, LLC
Chalk Ridge Shop

3. Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

1. Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
2. Use absorbent materials on small spills rather than hosing down or burying the spill.
3. Absorbent materials should be promptly removed and disposed of properly.
4. Follow the practice below for a minor spill.
5. Contain the spread of the spill.
6. Recover spilled materials.
7. Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

Semi-Significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

Spills should be cleaned up immediately:

1. Contain spread of the spill.
2. Notify the project foreman immediately.
3. If the spill occurs on paved or impermeable surfaces, clean up using “dry” methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
4. If the spill occurs in dirt areas, contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
5. If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

1. Notify the TCEQ by telephone as soon as possible within 24 hours at 512-339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor’s responsibility to have all emergency phone numbers at the construction site.

Central Texas Stone & Aggregate, LLC
Chalk Ridge Shop

2. For spills of the federal reportable quantities, in conformance with the requirements in 40 CFR parts 110, 117, and 302, the contractor should notify the National Response Center at (800) 424-8802.
3. Notification should first be made by telephone and followed up with a written report.
4. The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
5. Other agencies which may need to be consulted include, but are not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.

In the event of a reportable spill, the following Emergency Response Agencies can be contacted for assistance. Always inform your supervisor of a reportable spill immediately. Follow company policy when responding to an emergency.

State Emergency Response Commission	(512) 424-2208
National Response Center	(800) 424-8802
US EPA Region 6, Dallas, 24-hr Number	(866) 372-7745
National Weather Service	(281) 337-5074
TCEQ 24-hr	(800) 832-8224
TCEQ Region 11	(512) 339-2929

Vehicle and Equipment

1. If maintenance must occur on-site, use a designated area and a secondary containment, located away from drainage courses, to prevent the run-on of stormwater and the runoff of spills.
2. Regularly inspect on-site vehicles and equipment for leaks and repairs.
3. Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site.
4. Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
5. Place drip pans or absorbent materials under paving equipment when it is not in use.
6. Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.

Central Texas Stone & Aggregate, LLC
Chalk Ridge Shop

7. Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
8. Oil Filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters
9. Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure that it is not leaking.

Temporary Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(A), (B), (D)(I) and (G); 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 **Temporary Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Curt G. Campbell - PE, TX License No. 106851, TX. Firm 4524

Date: 7/27/2023

Signature of Customer/Agent:

Regulated Entity Name: Chalk Ridge Shop

Project Information

Potential Sources of Contamination

Examples: Fuel storage and use, chemical storage and use, use of asphaltic products, construction vehicles tracking onto public roads, and existing solid waste.

1. Fuels for construction equipment and hazardous substances which will be used during construction:

The following fuels and/or hazardous substances will be stored on the site: Diesel

These fuels and/or hazardous substances will be stored in:

- Aboveground storage tanks with a cumulative storage capacity of less than 250 gallons will be stored on the site for less than one (1) year.

- Aboveground storage tanks with a cumulative storage capacity between 250 gallons and 499 gallons will be stored on the site for less than one (1) year.
- Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An Aboveground Storage Tank Facility Plan application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project.
- Fuels and hazardous substances will not be stored on the site.
- 2. **Attachment A - Spill Response Actions.** A site specific description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is attached.
- 3. Temporary aboveground storage tank systems of 250 gallons or more cumulative storage capacity must be located a minimum horizontal distance of 150 feet from any domestic, industrial, irrigation, or public water supply well, or other sensitive feature.
- 4. **Attachment B - Potential Sources of Contamination.** A description of any activities or processes which may be a potential source of contamination affecting surface water quality is attached.

Sequence of Construction

- 5. **Attachment C - Sequence of Major Activities.** A description of the sequence of major activities which will disturb soils for major portions of the site (grubbing, excavation, grading, utilities, and infrastructure installation) is attached.
 - For each activity described, an estimate (in acres) of the total area of the site to be disturbed by each activity is given.
 - For each activity described, include a description of appropriate temporary control measures and the general timing (or sequence) during the construction process that the measures will be implemented.
- 6. Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: N/A

Temporary Best Management Practices (TBMPs)

Erosion control examples: tree protection, interceptor swales, level spreaders, outlet stabilization, blankets or matting, mulch, and sod. Sediment control examples: stabilized construction exit, silt fence, filter dikes, rock berms, buffer strips, sediment traps, and sediment basins. Please refer to the Technical Guidance Manual for guidelines and specifications. All structural BMPs must be shown on the site plan.

- 7. **Attachment D – Temporary Best Management Practices and Measures.** TBMPs and measures will prevent pollution of surface water, groundwater, and stormwater. The construction-phase BMPs for erosion and sediment controls have been designed to retain sediment on site to the extent practicable. The following information is attached:

- A description of how BMPs and measures will prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.
 - A description of how BMPs and measures will prevent pollution of surface water or groundwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.
 - A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.
 - A description of how, to the maximum extent practicable, BMPs and measures will maintain flow to naturally-occurring sensitive features identified in either the geologic assessment, TCEQ inspections, or during excavation, blasting, or construction.
8. The temporary sealing of a naturally-occurring sensitive feature which accepts recharge to the Edwards Aquifer as a temporary pollution abatement measure during active construction should be avoided.
- Attachment E - Request to Temporarily Seal a Feature.** A request to temporarily seal a feature is attached. The request includes justification as to why no reasonable and practicable alternative exists for each feature.
 - There will be no temporary sealing of naturally-occurring sensitive features on the site.
9. **Attachment F - Structural Practices.** A description of the structural practices that will be used to divert flows away from exposed soils, to store flows, or to otherwise limit runoff discharge of pollutants from exposed areas of the site is attached. Placement of structural practices in floodplains has been avoided.
10. **Attachment G - Drainage Area Map.** A drainage area map supporting the following requirements is attached:
- For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.
 - For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.
 - For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.
 - There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be used in combination with other erosion and sediment controls within each disturbed drainage area.

- There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. Erosion and sediment controls other than sediment basins or sediment traps within each disturbed drainage area will be used.
11. **Attachment H - Temporary Sediment Pond(s) Plans and Calculations.** Temporary sediment pond or basin construction plans and design calculations for a proposed temporary BMP or measure have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information must be signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed temporary BMPs and measures are attached.
- N/A
12. **Attachment I - Inspection and Maintenance for BMPs.** A plan for the inspection of each temporary BMP(s) and measure(s) and for their timely maintenance, repairs, and, if necessary, retrofit is attached. A description of the documentation procedures, recordkeeping practices, and inspection frequency are included in the plan and are specific to the site and/or BMP.
13. All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections by the applicant or the executive director, or other information indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations.
14. If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain).
15. Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake will be provided that can indicate when the sediment occupies 50% of the basin volume.
16. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).

Soil Stabilization Practices

Examples: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, or preservation of mature vegetation.

17. **Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices.** A schedule of the interim and permanent soil stabilization practices for the site is attached.

18. Records must be kept at the site of the dates when major 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.
19. Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

Administrative Information

20. All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.
21. If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately suspended. The appropriate TCEQ Regional Office shall be immediately notified. Regulated activities must cease and not continue until the TCEQ has reviewed and approved the methods proposed to protect the aquifer from any adverse impacts.
22. Silt fences, diversion berms, and other temporary erosion and sediment controls will be constructed and maintained as appropriate to prevent pollutants from entering sensitive features discovered during construction.

Central Texas Stone & Aggregate, LLC
Chalk Ridge Shop

Temporary Stormwater Runoff Attachment A

Spill Response Actions

Education

6. Be aware that different materials pollute in different amounts. Make sure that each employee knows what a “significant spill” is for each material they use, and what is the appropriate response for “significant” and “insignificant” spills. Employees should also be aware of when a spill must be reported to the TCEQ.
7. Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
8. Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular earthen meetings).
9. Establishing a continuing education program to indoctrinate new employees.
10. Have a contractor’s superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

13. To the extent that the work can be accomplished safely, spills of oil, petroleum products, and substances listed under 40 CFR parts 110.117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
14. Store hazardous materials and wastes in covered containers and protect from vandalism.
15. Place a stockpile of spill clean-up materials where it will be readily accessible.
16. Train employees in spill prevention and cleanup.
17. Designate responsible individuals to oversee and enforce control measures.
18. Spills should be covered and protected from stormwater run-on during rainfall to the extent that it doesn’t compromise cleanup activities.
19. Do not bury or wash spills with water.
20. Store and dispose of used clean-up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
21. Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.
22. Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.

Central Texas Stone & Aggregate, LLC

Chalk Ridge Shop

23. Place Safety Data Sheets (SDS), as well as proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
24. Keep waste storage areas clean, well-organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

4. Clean up leaks and spills immediately.
5. Use a rag for small spills on paved surfaces. A damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.
6. Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

8. Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
9. Use absorbent materials on small spills rather than hosing down or burying the spill.
10. Absorbent materials should be promptly removed and disposed of properly.
11. Follow the practice below for a minor spill.
12. Contain the spread of the spill.
13. Recover spilled materials.
14. Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

Semi-Significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

Spills should be cleaned up immediately:

6. Contain spread of the spill.
7. Notify the project foreman immediately.

Central Texas Stone & Aggregate, LLC
Chalk Ridge Shop

8. If the spill occurs on paved or impermeable surfaces, clean up using “dry” methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
9. If the spill occurs in dirt areas, contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
10. If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

6. Notify the TCEQ by telephone as soon as possible within 24 hours at 512-339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor’s responsibility to have all emergency phone numbers at the construction site.
7. For spills of the federal reportable quantities, in conformance with the requirements in 40 CFR parts 110, 117, and 302, the contractor should notify the National Response Center at (800) 424-8802.
8. Notification should first be made by telephone and followed up with a written report.
9. The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
10. Other agencies which may need to be consulted include, but are not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.

In the event of a reportable spill, the following Emergency Response Agencies can be contacted for assistance. Always inform your supervisor of a reportable spill immediately. Follow company policy when responding to an emergency.

State Emergency Response Commission	(512) 424-2208
National Response Center	(800) 424-8802
US EPA Region 6, Dallas, 24-hr Number	(866) 372-7745
National Weather Service	(281) 337-5074
TCEQ 24-hr	(800) 832-8224
TCEQ Region 11	(512) 339-2929

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Vehicle and Equipment

10. If maintenance must occur on-site, use a designated area and a secondary containment, located away from drainage courses, to prevent the run-on of stormwater and the runoff of spills.
11. Regularly inspect on-site vehicles and equipment for leaks and repairs.
12. Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site.
13. Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
14. Place drip pans or absorbent materials under paving equipment when it is not in use.
15. Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
16. Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
17. Oil Filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
18. Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure that it is not leaking.

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Chalk Ridge Shop**

Temporary Stormwater Attachment B

Potential Sources of Contamination

Potential sources of contamination include fuels, lubricants from vehicles and equipment, and trash/debris.

Temporary Stormwater Attachment C

Sequence of Major Activities

The construction of this site will begin with the clearing of trees and vegetation in the project area. Then the base for the site pad/entrances will be set down in preparation for the shop building and fuel island. The pond and swales will be constructed as shown on the plan set and site map. Once the BMPs have been constructed, the shop building and fuel pad will be built. Finally, the double walled fuel tanks will be set in the proposed fuel island.

Temporary Stormwater Attachment D

Temporary Best Management Practices and Measures (TBMPs)

7a) TBMPs and measures will prevent pollution of surface water, groundwater and stormwater that originates upgradient from the site and flows across the site.

There will be swales along the northern and western sides of the area being developed to direct upgradient stormwater into Pond A as shown on the Site Map. A silt fence will be used downgradient of the disturbed areas until Pond A is complete and the berm, swales, and vegetative filter strip are stabilized with vegetation.

7b) TBMPs and measures will prevent pollution of surface water, groundwater and stormwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.

The water which originates on site will be redirected with the use of a berm and swale into a detention pond in series with a grassy swale.

7c) TBMPs and measures will prevent pollution of surface streams, sensitive features stormwater and the aquifer.

There are no sensitive features that have been noted on site.

There are surface streams that will be affected downgradient of the site.

7d) To the maximum extent practicable TBMPs and measures will maintain flow to naturally occurring sensitive features identified in the geologic assessment, TCEQ inspections, or during evacuation, blasting, or construction.

There were no sensitive features identified on site during the geological assessment.

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Chalk Ridge Shop

Temporary Stormwater Attachment F

Structural Practices

Temporary best management practices proposed for the quarry include silt fences, an earthen berm, and swales. The silt fences will be used during the initial clearing and construction to mitigate potential additional TSS runoff due to disturbances. The berm and swales are in place to divert onsite runoff from the shop and fuel island (DA-001) to Pond A.

Temporary Stormwater Attachment G

Drainage Area Map

Please see attached Drainage Area Map.

Temporary Stormwater Attachment I

Inspection and Maintenance for BMPs

The pad should be inspected weekly for any erosion and swales and earthen berms and vegetative buffers should be inspected monthly. Written documentation of these inspections should be kept during the course of construction at the project site. Any erosion of the berm should be backfilled and compacted as soon as possible. Trash should be removed, and any eroded areas of the buffers should be reseeded as soon as possible.

Permanent Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(C), (D)(li), (E), and (5), 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 **Permanent Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Curt G. Campbell, PE TX License No. 106851, TX Firm No 4524

Date: 7/27/2023

Signature of Customer/Agent

Regulated Entity Name: Chalk Ridge Shop

Permanent Best Management Practices (BMPs)

Permanent best management practices and measures that will be used during and after construction is completed.

- Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.
 N/A
- 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: _____

N/A

3. 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

4. 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.

5. 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 A - 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.

6. **Attachment B - 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.
7. **Attachment C - 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.
8. **Attachment D - BMPs for Surface Streams.** A description of the BMPs and measures that prevent pollutants from entering surface streams, sensitive features, or the aquifer is attached. Each feature identified in the Geologic Assessment as sensitive has been addressed.
- N/A
9. The applicant understands that to the extent practicable, BMPs and measures must maintain flow to naturally occurring sensitive features identified in either the geologic assessment, executive director review, or during excavation, blasting, or construction.
- The permanent sealing of or diversion of flow from a naturally-occurring sensitive feature that accepts recharge to the Edwards Aquifer as a permanent pollution abatement measure has not been proposed.
 - Attachment E - Request to Seal Features.** A request to seal a naturally-occurring sensitive feature, that includes, for each feature, a justification as to why no reasonable and practicable alternative exists, is attached.
10. **Attachment F - Construction Plans.** All construction plans and design calculations for the proposed permanent BMP(s) and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. The plans are attached and, if applicable include:
- Design calculations (TSS removal calculations)
 - TCEQ construction notes
 - All geologic features
 - All proposed structural BMP(s) plans and specifications
- N/A

11. **Attachment G - Inspection, Maintenance, Repair and Retrofit Plan.** A plan for the inspection, maintenance, repairs, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan includes all of the following:
- Prepared and certified by the engineer designing the permanent BMPs and measures
 - Signed by the owner or responsible party
 - Procedures for documenting inspections, maintenance, repairs, and, if necessary retrofit
 - A discussion of record keeping procedures
- N/A
12. **Attachment H - 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
13. **Attachment I -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 results in water quality degradation.
- N/A

Responsibility for Maintenance of Permanent BMP(s)

Responsibility for maintenance of best management practices and measures after construction is complete.

14. 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.
- N/A
15. 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.
- N/A

**Central Texas Stone & Aggregate, LLC
Chalk Ridge Shop**

Permanent Stormwater Section Attachment B

BMPs for Upgradient Stormwater

A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater or stormwater that originates upgradient from the site and flows across the site.

The swales and earthen berms will be used to divert stormwater that runs across the site into Pond A as shown on the Site Map. The engineered vegetive filter strip will be placed on the downgradient side of the roads and therefore will treat all stormwater runoff originating offsite and flowing downgradient across the roads.

Permanent Stormwater Section Attachment C

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:

Pollution of surface water, groundwater or stormwater that originates on-site or flows off -site during the life of the shop will be mitigated through the use of Pond A and a grassy swale to which have been sized to meet the water quantity volume and the water quality volume per the standards set forth in RG-348. The storm water on-site will be diverted to Pond A through the use of swales and an earthen berm.

Engineered vegetive filter strips will be used to treat the additional TSS from runoff from the proposed roads. The vegetive filter strips will be sized according to TCEQ standards set forth in RG-348 and will remove a minimum of 80% of the additional TSS due to increased impervious cover.

Permanent Stormwater Section Attachment F

Construction Plans

Please see attached Site Map.

Permanent Stormwater Section Attachment G

Inspection, Maintenance, Repair, and Retrofit Plan

The earthen berm should be inspected quarterly until sufficiently stabilized with vegetation. Written documentation of these inspections should be kept throughout the course of construction of the project site. Any erosion of berms should be backfilled and compacted as soon as possible.

Engineered vegetated filter strips and the earthen berm should be inspected at least twice annually, until the Final Earthen Berm has been vegetated, for erosion or damage to vegetation. Written documentation of these inspections should be kept during the course of construction at the project site. Any observed bare spots or areas of erosion should be reseeded.

Central Texas Stone & Aggregate, LLC Chalk Ridge Shop

Pond A should be inspected at least twice a year and sediment should be removed accordingly to maintain adequate storage volume.

Extended Detention Basin:

Routine Maintenance

- *Inspections.* Basins should be inspected at least twice a year (once during or immediately following wet weather) to evaluate facility operation. When possible, inspections should be conducted during wet weather to determine if the pond is meeting the target detention times. In particular, the extended detention control device should be regularly inspected for evidence of clogging, or conversely, for too rapid a release. If the design drawdown times are exceeded by more than 24 hours, then repairs should be scheduled immediately. The upper stage pilot channel, if any, and its flow path to the lower stage should be checked for erosion problems. During each inspection, erosion areas inside and downstream of the BMP should be identified and repaired or revegetated immediately.
- *Mowing.* The upper stage, side slopes, embankment, and emergency spillway of an extended detention basin must be mowed regularly to discourage woody growth and control weeds. Grass areas in and around basins should be mowed at least twice annually to limit vegetation height to 18 inches. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas. When mowing of grass is performed, a mulching mower should be used, or grass clippings should be caught and removed.
- *Debris and Litter Removal.* Debris and litter will accumulate near the extended detention control device and should be removed during regular mowing operations and inspections. Particular attention should be paid to floating debris that can eventually clog the control device or riser.
- *Erosion Control.* The pond side slopes, emergency spillway, and embankment all may periodically suffer from slumping and erosion, although this should not occur often if the soils are properly compacted during construction. Regrading and revegetation may be required to correct the problems. Similarly, the channel connecting an upper stage with a lower stage may periodically need to be replaced or repaired.
- *Nuisance Control.* Standing water (not desired in a extended detention basin) or soggy conditions within the lower stage of the basin can create nuisance conditions for nearby residents. Odors, mosquitoes, weeds, and litter are all occasionally perceived to be problems. Most of these problems are generally a sign that regular inspections and maintenance are not being performed (e.g., mowing, debris removal, clearing the outlet control device).

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Non-Routine Maintenance

- *Structural Repairs and Replacement.* With each inspection, any damage to the structural elements of the system (pipes, concrete drainage structures, retaining walls, etc.) should be identified and repaired immediately. These repairs should include patching of cracked concrete, sealing of voids, and removal of vegetation from cracks and joints. The various inlet/outlet and riser works in a basin will eventually deteriorate and must be replaced. Public works experts have estimated that corrugated metal pipe (CMP) has a useful life of about 25 yr, whereas reinforced concrete barrels and risers may last from 50 to 75 yr.
- *Sediment Removal.* When properly designed, dry extended detention basins will accumulate quantities of sediment over time. Sediment accumulation is a serious maintenance concern in extended detention dry ponds for several reasons. First, the sediment gradually reduces available stormwater management storage capacity within the basin. Second, unlike wet extended detention basins (which have a permanent pool to conceal deposited sediments), sediment accumulation can make dry extended detention basins very unsightly. Third, and perhaps most importantly, sediment tends to accumulate around the control device. Sediment deposition increases the risk that the orifice will become clogged, and gradually reduces storage capacity reserved for pollutant removal. Sediment can also be resuspended if allowed to accumulate over time and escape through the hydraulic control to downstream channels and streams. For these reasons, accumulated sediment needs to be removed from the lower stage when sediment buildup fills 20% of the volume of the basin or at least every 10 years.

Grassy Swales:

Routine 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.* Lawn mowing should be performed routinely, as needed, throughout the growing season. Grass height should not exceed 18 inches. Grass cuttings should be collected and disposed of offsite, or a mulching mower can be used. 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.
- *Inspection.* Inspect swales at least twice annually for erosion or damage to vegetation; however, additional inspection after periods of heavy runoff is most desirable. The swale 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,

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Chalk Ridge Shop

and to plan for long-term restorative maintenance needs. Bare spots and areas of erosion identified during semi-annual inspections should be replanted and restored to meet specifications. Construction of a level spreader device may be necessary to reestablish shallow overland flow.

- *Debris and Litter Removal.* Trash tends to accumulate in swale areas, particularly along highways. Any swale structures (i.e. check dams) 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 two times per year (Urbonas et al., 1992).

- *Sediment Removal.* Sediment accumulating near culverts and in channels needs to be removed when they build up to 3 inches at any spot, or cover vegetation. Excess sediment should be removed by hand or with flat-bottomed shovels. If areas are eroded, they should be filled, compacted, and reseeded so that the final grade is level with the bottom of the swale. Sediment removal should be performed periodically, as determined through inspection.

- *Grass Reseeding and Mulching.* A healthy dense grass should be maintained in the channel and side slopes. Grass damaged during the sediment removal process should be promptly replaced using the same seed mix used during swale establishment. If possible, flow should be diverted from the damaged areas until the grass is firmly established.

- *Public Education.* Private homeowners are often responsible for roadside swale maintenance. Unfortunately, overzealous lawn care on the part of homeowners can present some problems. For example, mowing the swale too close to the ground, or excessive application of fertilizer and pesticides will all be detrimental to the performance of the swale. Pet waste can also be a problem in swales, and should be removed to avoid contamination from fecal coliform and other waste-associated bacteria. The delegation of maintenance responsibilities to individual landowners is a cost benefit to the locality. However, localities should provide an active educational program to encourage the recommended practices.

Inspection, Maintenance, Repair and Retrofit Plan

I, Jeff Harris, have read and understand the Inspection, Maintenance, Repair and Retrofit (IMRR) Plan contained in this Water Pollution Abatement Plan (WPAP) Modification plan.

I understand the specific Permanent Best Management Practices (PBMPs) and associated inspection and maintenance schedule which are outlined in this IMRR Plan. Anderson Columbia Co., Inc. will implement these inspections and perform maintenance as required to meet the intent of the IMRR Plan.

Name and signature of responsible party for maintenance of permanent BMPs

Print Name: Jeff Harris
Joe Bland Construction, LP

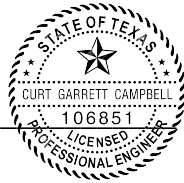
Signature _____

Date: _____

Name and signature of Engineer

Print Name: Curt G. Campbell, P.E.
Westward Environmental, Inc.

Signature 



Date: 8/28/2023

Agent Authorization Form
For Required Signature
Edwards Aquifer Protection Program
Relating to 30 TAC Chapter 213
Effective June 1, 1999

I _____ Cole Bland
Print Name

_____ *Cole Bland*
Title - Owner/President/Other

of _____ Joe Bland Construction, L.P.
Corporation/Partnership/Entity Name

have authorized Curt Campbell, PE; Gary Nicholls, PE; Doug Millsaps, PE; Vance Houy, PE; Andrea Kidd, PE
Print Name of Agent/Engineer

of _____ Westward Environmental, Inc.
Print Name of Firm

to represent and act on the behalf of the above named Corporation, Partnership, or Entity for the purpose of preparing and submitting this plan application to the Texas Commission on Environmental Quality (TCEQ) for the review and approval consideration of regulated activities.

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to \$10,000 per day per violation.
2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.
3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.
4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.
5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:

Cole Bland
Applicant's Signature

12/12/22
Date

THE STATE OF TEXAS §

County of TARRANT §

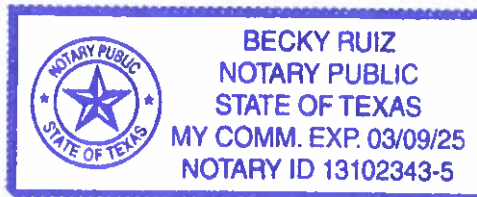
BEFORE ME, the undersigned authority, on this day personally appeared Cole Bland known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 13th day of December, 2022

Becky Ruiz
NOTARY PUBLIC

Becky Ruiz
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 03/09/25





TCEQ Use Only

TCEQ Core Data Form

For detailed instructions regarding completion of this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (If other is checked please describe in space provided.)		
<input checked="" type="checkbox"/> New Permit, Registration or Authorization (Core Data Form should be submitted with the program application.)		
<input type="checkbox"/> Renewal (Core Data Form should be submitted with the renewal form)	<input type="checkbox"/> Other	
2. Customer Reference Number (if issued)	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number (if issued)
CN 602465874		RN

SECTION II: Customer Information

4. General Customer Information		5. Effective Date for Customer Information Updates (mm/dd/yyyy)	
<input type="checkbox"/> New Customer		<input checked="" type="checkbox"/> Update to Customer Information	
<input type="checkbox"/> Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)		<input type="checkbox"/> Change in Regulated Entity Ownership	
The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).			
6. Customer Legal Name (If an individual, print last name first: eg: Doe, John)		If new Customer, enter previous Customer below:	
Joe Bland Construction, L.P.			
7. TX SOS/CPA Filing Number	8. TX State Tax ID (11 digits)	9. Federal Tax ID (9 digits)	10. DUNS Number (if applicable)
11. Type of Customer:	<input checked="" type="checkbox"/> Corporation	<input type="checkbox"/> Individual	Partnership: <input type="checkbox"/> General <input type="checkbox"/> Limited
Government: <input type="checkbox"/> City <input type="checkbox"/> County <input type="checkbox"/> Federal <input type="checkbox"/> State <input type="checkbox"/> Other	<input type="checkbox"/> Sole Proprietorship	<input type="checkbox"/> Other:	
12. Number of Employees		13. Independently Owned and Operated?	
<input type="checkbox"/> 0-20 <input type="checkbox"/> 21-100 <input checked="" type="checkbox"/> 101-250 <input type="checkbox"/> 251-500 <input type="checkbox"/> 501 and higher		<input type="checkbox"/> Yes <input type="checkbox"/> No	
14. Customer Role (Proposed or Actual) – as it relates to the Regulated Entity listed on this form. Please check one of the following			
<input type="checkbox"/> Owner <input type="checkbox"/> Operator <input checked="" type="checkbox"/> Owner & Operator			
<input type="checkbox"/> Occupational Licensee <input type="checkbox"/> Responsible Party <input type="checkbox"/> Voluntary Cleanup Applicant <input type="checkbox"/> Other:			
15. Mailing Address:	13111 Desau Road		
	City	Austin	State TX ZIP 78754 ZIP + 4
16. Country Mailing Information (if outside USA)		17. E-Mail Address (if applicable)	
18. Telephone Number	19. Extension or Code	20. Fax Number (if applicable)	
(512) 821-2808		() -	

SECTION III: Regulated Entity Information

21. General Regulated Entity Information (If 'New Regulated Entity' is selected below this form should be accompanied by a permit application)		
<input checked="" type="checkbox"/> New Regulated Entity <input type="checkbox"/> Update to Regulated Entity Name <input type="checkbox"/> Update to Regulated Entity Information		
The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency Data Standards (removal of organizational endings such as Inc, LP, or LLC).		
22. Regulated Entity Name (Enter name of the site where the regulated action is taking place.)		
Chalk Ridge Shop		

23. Street Address of the Regulated Entity: <i>(No PO Boxes)</i>	601 County Road 239						
	City	Florence	State	TX	ZIP	76527	ZIP + 4
24. County	Williamson County						

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	From I-35, 5.8 miles on 195, Turn right onto CR 239, destination is on your left in 0.15 miles						
26. Nearest City	Florence			State	TX	Nearest ZIP Code	76527
27. Latitude (N) In Decimal:	Degrees		Minutes	Seconds	28. Longitude (W) In Decimal:	Degrees	
	30	45'	47.8"		97	43'	35"
29. Primary SIC Code (4 digits)	30. Secondary SIC Code (4 digits)	31. Primary NAICS Code (5 or 6 digits)		32. Secondary NAICS Code (5 or 6 digits)			
33. What is the Primary Business of this entity? <i>(Do not repeat the SIC or NAICS description.)</i>							
34. Mailing Address:	13111 Desau Road						
	City	Austin	State	TX	ZIP	78754	ZIP + 4
35. E-Mail Address:	cole@joeblandconstruction.com						
36. Telephone Number		37. Extension or Code			38. Fax Number <i>(if applicable)</i>		
(512) 821-2808					() -		

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.


<input type="checkbox"/> Dam Safety	<input type="checkbox"/> Districts	<input checked="" type="checkbox"/> Edwards Aquifer	<input type="checkbox"/> Emissions Inventory Air	<input type="checkbox"/> Industrial Hazardous Waste
<input type="checkbox"/> Municipal Solid Waste	<input type="checkbox"/> New Source Review Air	<input type="checkbox"/> OSSF	<input type="checkbox"/> Petroleum Storage Tank	<input type="checkbox"/> PWS
<input type="checkbox"/> Sludge	<input type="checkbox"/> Storm Water	<input type="checkbox"/> Title V Air	<input type="checkbox"/> Tires	<input type="checkbox"/> Used Oil
<input type="checkbox"/> Voluntary Cleanup	<input type="checkbox"/> Waste Water	<input type="checkbox"/> Wastewater Agriculture	<input type="checkbox"/> Water Rights	<input type="checkbox"/> Other:

SECTION IV: Preparer Information

40. Name:	Matthew Morris	41. Title:	Staff Engineer
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(830) 249-8284		(830) 249-0221	mmorris@westwardenv.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	Joe Bland Construction, L.P.	Job Title:	
Name <i>(In Print)</i> :	Cole Bland	Phone:	(512) 821- 2808
Signature:		Date:	12/12/22

Application Fee Form

Texas Commission on Environmental Quality

Name of Proposed Regulated Entity: Chalk Ridge Shop

Regulated Entity Location: 601 County Road 239, Florence, TX

Name of Customer: Joe Bland Constrution, L.P.

Contact Person: Cole Bland

Phone: 512-821-2808

Customer Reference Number (if issued):CN 602465874

Regulated Entity Reference Number (if issued):RN New

Austin Regional Office (3373)

Hays

Travis

Williamson

San Antonio Regional Office (3362)

Bexar

Medina

Uvalde

Comal

Kinney

Application fees must be paid by check, certified check, or money order, payable to the **Texas Commission on Environmental Quality**. Your canceled check will serve as your receipt. **This form must be submitted with your fee payment.** This payment is being submitted to:

Austin Regional Office

San Antonio Regional Office

Mailed to: TCEQ - Cashier

Overnight Delivery to: TCEQ - Cashier

Revenues Section

12100 Park 35 Circle

Mail Code 214

Building A, 3rd Floor

P.O. Box 13088

Austin, TX 78753

Austin, TX 78711-3088

(512)239-0357

Site Location (Check All That Apply):

Recharge Zone

Contributing Zone

Transition Zone

<i>Type of Plan</i>	<i>Size</i>	<i>Fee Due</i>
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	\$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	\$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	9.8 Acres	\$ 5,000
Sewage Collection System	L.F.	\$
Lift Stations without sewer lines	Acres	\$
Underground or Aboveground Storage Tank Facility	3 Tanks	\$ 1,950
Piping System(s)(only)	Each	\$
Exception	Each	\$
Extension of Time	Each	\$

Signature: 

Date: 12/12/22

Application Fee Schedule

Texas Commission on Environmental Quality

Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

<i>Project</i>	<i>Project Area in Acres</i>	<i>Fee</i>
One Single Family Residential Dwelling	< 5	\$650
Multiple Single Family Residential and Parks	< 5	\$1,500
	5 < 10	\$3,000
	10 < 40	\$4,000
	40 < 100	\$6,500
	100 < 500	\$8,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	≥ 500	\$10,000
	< 1	\$3,000
	1 < 5	\$4,000
	5 < 10	\$5,000
	10 < 40	\$6,500
	40 < 100	\$8,000
	≥ 100	\$10,000

Organized Sewage Collection Systems and Modifications

<i>Project</i>	<i>Cost per Linear Foot</i>	<i>Minimum Fee- Maximum Fee</i>
Sewage Collection Systems	\$0.50	\$650 - \$6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

<i>Project</i>	<i>Cost per Tank or Piping System</i>	<i>Minimum Fee- Maximum Fee</i>
Underground and Aboveground Storage Tank Facility	\$650	\$650 - \$6,500

Exception Requests

<i>Project</i>	<i>Fee</i>
Exception Request	\$500

Extension of Time Requests

<i>Project</i>	<i>Fee</i>
Extension of Time Request	\$150

**Central Texas Stone and Aggregate, LLC
Chalk Ridge Shop
WPAP & AST Drainage Report**

Executive Summary

Central Texas Stone and Aggregate, LLC are planning to build a shop and put in 3 aboveground storage tanks on a site pad located within their 9.17-acre site in Williamson County, Texas. The site, AST area and additional impervious cover will be treated with a detention pond (Pond A) in conjunction with a grassy swale.

The proposed extended detention pond (Pond A) in conjunction with the grassy swale will be used to treat the runoff from DA-001 which is 9.17 acres. The swales and earthen berms shown on the Site Map will divert stormwater to Pond A which will discharge to the 125-foot grassy swale. These two BMPs in series have been designed to treat the runoff from the proposed 3.8 Acres of impervious cover.

Central Texas Stone and Aggregate, LLC
Chalk Ridge Shop
WPAP & AST Drainage Report

2 Introduction

2.1 Purpose

The purpose of this report is to demonstrate the design procedure for the existing extended detention pond (Pond A) in series with a grassy swale. Pond A will be verified for treatment of any additional runoff and TSS from the proposed additional impervious cover from the Shop area and AST area. The report will detail the drainage area characteristics which include the drainage for the basin, the water quality analysis, and the water quantity analysis.

2.2 Drainage Area Characteristics

DA-001 has a total area of 3.8 Acres of impervious cover. The swales and earthen berm will divert stormwater to Pond A which will then discharge into the proposed 125-Foot grassy swale.

2.3 General Analysis Notes

- 1) The drainage area was analyzed as an independent drainage basin.
- 2) The pond has been designed as an extended detention pond in series with a grassy swale, the combination of which will provide a TSS removal efficiency of more than 80%
- 3) The pond will be located over the Edwards Aquifer Recharge Zone and therefore is required to be lined.
- 4) Interior slopes along the inside of the pond are a minimum 3:1 (H:V).

Central Texas Stone and Aggregate, LLC
Chalk Ridge Shop
WPAP & AST Drainage Report

3 Water Quality Analysis

3.1 Methodology

Water quality analysis was performed using the TCEQ technical guidance document RG-348 for best management practices over the Edwards Aquifer. The water quality volume was determined using the RG-348 excel spreadsheet which has been provided by the TCEQ dated 4/20/2009. This spreadsheet was used to determine the anticipated increase in TSS with the additional impervious cover being added to the existing conditions.

3.2 BMP Characteristics

Pond A

Pond A has been designed as an extended detention pond in series with a grassy swale which will treat 9.17 acres of drainage area. The removal efficiency of this detention pond in series with the grassy swale is 83.75%. The required removal of TSS by the TCEQ for the area treated by this area was calculated as $L_m = 3,308 \text{ lbs}$ which was set at the minimum for the desired removal for the pond in series with the grassy swale. For this WPAP, the TSS removal was calculated as $L_R = 3,601 \text{ lbs}$. which is above the minimum 80% removal requirement of 3,308 lbs. The water quality volume (WQV) was calculated as 20,892 cu. ft. and the total capture volume (TCV) was calculated as 26,115 cu. Ft (0.6 ac. Ft.).

Central Texas Stone and Aggregate, LLC
Chalk Ridge Shop
WPAP & AST Drainage Report

4 Water Quantity Analysis

4.1 Methodology

Water Quantity Analysis was performed for the proposed detention pond using HydroCAD software and AutoCAD software. The pond has been designed utilizing the following criteria 1) low flow condition with runoff equivalent to the WQV 2) high flow conditions by routing both the 25-year and 100-year 24-hour storm events. The low flow analysis was used to size the low flow orifice for recovery of approximately 54% of the WQV within 24 hours. The high flow analysis was used to verify the available freeboard and site the overflow spillway during the 25-year 24-hour storm. In addition, the pond was analyzed for the 100-year 24-hour event. This storm was run to determine the spillway capacity and pond capacity.

4.2 Flow Analysis

Pond A

Low Flow Analysis

RG-348 recommends that an extended detention pond be designed to drain the WQV in a minimum of 24 hours. The recovery of a system is driven by the static head above the outfall elevation and the head is constantly decreasing during recovery. Since this project is not designed with any mechanical devices, an orifice has been sized to comply with regulations. A 4-inch in diameter cylindrical orifice has been designed and tested (Using HydroCAD) with at the base elevation of the pond, 931 ft.asml. The low flow outfall has been sized to allow approximately 54% of the designed WQV to leave the pond in 24 hours. This also allows for nearly the entirety of the storm to drain in 48 hours after the WQV.

High Flow Analysis

The pond top of bank is set at an elevation of 935 ft-asml. The spillway invert is set at an elevation of 933 ft-asml and is a 25-foot-long by 20-foot-long broad-crested weir. The overflow spillway for this pond was designed to pass the 25-year 24-hour storm event of 7.79 inches. The peak stage depth for this storm is 933.62 ft-asml which gives 1.38 feet of free board. The 100-year 24-hour storm event of 10.68 inches produces a peak stage of 933.99 ft-asml.

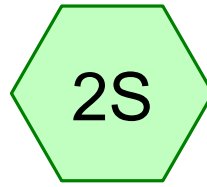
Grassy Swale

To meet the minimum removal efficiency, a grassy swale is required downgradient of the outfall. The spillway, however, does not run through the grassy swale and instead runs offsite as shown on the site map. To meet the requirements set forth in RG-348, the swale is proposed to have a 3-foot-wide bottom. A depth of a minimum 2-feet is proposed along with side slopes to be 3:1 horizontal to vertical. The drop from the top of the swale to the bottom will be 1 foot over the 125-foot length which gives a slope of 0.8%. This is within the TCEQ's required range of 0.5% to 2.5% per RG-348.

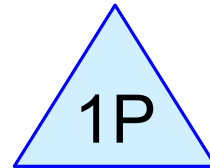
Central Texas Stone and Aggregate, LLC
Chalk Ridge Shop
WPAP & AST Drainage Report

5 Summary

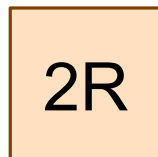
The removal efficiency of Pond A in series with a grassy swale is 83.75% based on the calculations included in RG-348. Additional information on the construction and maintenance procedures for this system is included in the WPAP and AST application submittal package.



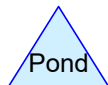
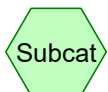
Development Area



Pond 1



Grassy Swale



10500.039-Pond Calcs

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.370	84	50-75% Grass cover, Fair, HSG D (2S)
3.800	98	Paved parking, (2S)
9.170	90	TOTAL AREA

10500.039-Pond Calcs

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
5.370	HSG D	2S
3.800	Other	2S
9.170		TOTAL AREA

10500.039-Pond Calcs

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	5.370	0.000	5.370	50-75% Grass cover, Fair	2S
0.000	0.000	0.000	0.000	3.800	3.800	Paved parking,	2S
0.000	0.000	0.000	5.370	3.800	9.170	TOTAL AREA	

10500.039-Pond Calcs

Type II 24-hr 25-YR Rainfall=7.79"

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Page 5

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: Development Area Runoff Area=9.170 ac 41.44% Impervious Runoff Depth=6.60"
Flow Length=650' Tc=26.5 min CN=90 Runoff=53.84 cfs 5.043 af

Reach 2R: Grassy Swale Avg. Flow Depth=0.13' Max Vel=0.76 fps Inflow=0.64 cfs 1.549 af
n=0.040 L=150.0' S=0.0067 '/' Capacity=86.13 cfs Outflow=0.64 cfs 1.546 af

Pond 1P: Pond 1 Peak Elev=933.62' Storage=101,445 cf Inflow=53.84 cfs 5.043 af
Primary=0.64 cfs 1.549 af Secondary=32.57 cfs 2.512 af Outflow=33.22 cfs 4.062 af

Total Runoff Area = 9.170 ac Runoff Volume = 5.043 af Average Runoff Depth = 6.60"
58.56% Pervious = 5.370 ac 41.44% Impervious = 3.800 ac

10500.039-Pond Calcs

Type II 24-hr 25-YR Rainfall=7.79"

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Page 6

Summary for Subcatchment 2S: Development Area

Runoff = 53.84 cfs @ 12.19 hrs, Volume= 5.043 af, Depth= 6.60"

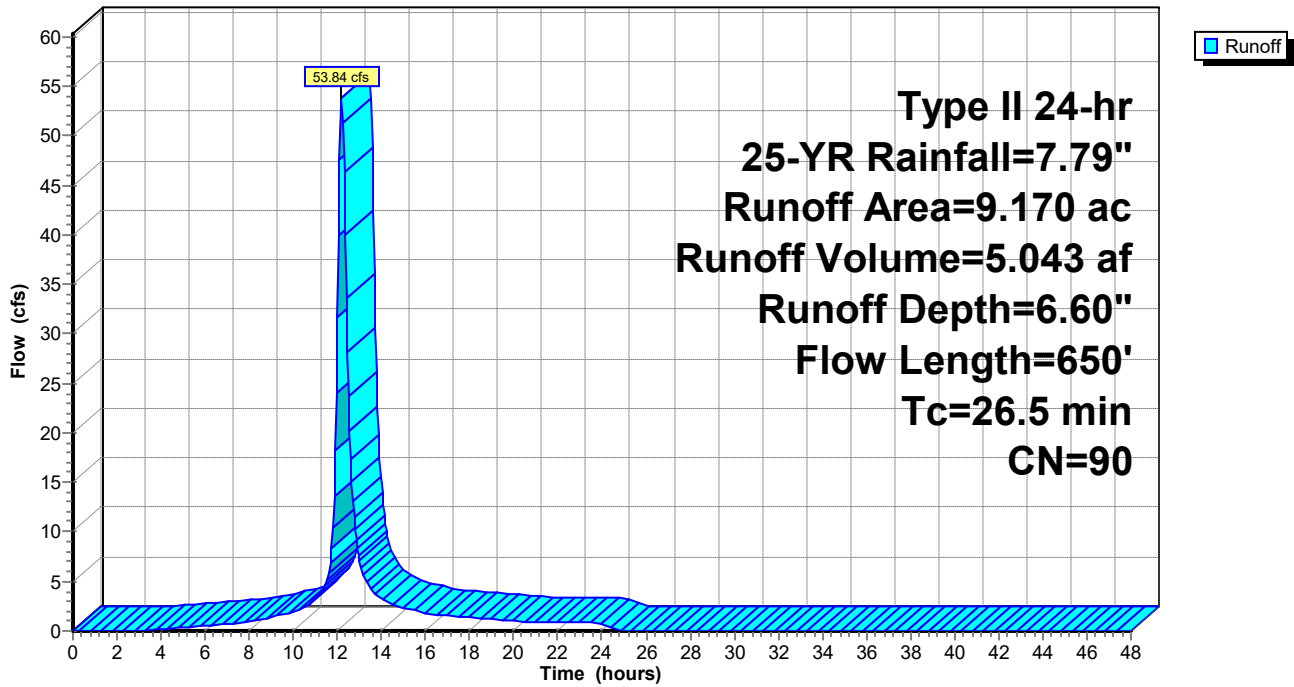
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=7.79"

Area (ac)	CN	Description
* 3.800	98	Paved parking,
5.370	84	50-75% Grass cover, Fair, HSG D
9.170	90	Weighted Average
5.370		58.56% Pervious Area
3.800		41.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0050	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.88"
10.1	300	0.0050	0.49		Shallow Concentrated Flow, SHALLOW Short Grass Pasture Kv= 7.0 fps
0.9	250	0.0500	4.54		Shallow Concentrated Flow, SHALLOW-PAVED Paved Kv= 20.3 fps
26.5	650	Total			

Subcatchment 2S: Development Area

Hydrograph



10500.039-Pond Calcs

Type II 24-hr 25-YR Rainfall=7.79"

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Hydrograph for Subcatchment 2S: Development Area

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.00	7.79	6.60	0.00
0.50	0.04	0.00	0.00	26.50	7.79	6.60	0.00
1.00	0.08	0.00	0.00	27.00	7.79	6.60	0.00
1.50	0.13	0.00	0.00	27.50	7.79	6.60	0.00
2.00	0.17	0.00	0.00	28.00	7.79	6.60	0.00
2.50	0.22	0.00	0.00	28.50	7.79	6.60	0.00
3.00	0.27	0.00	0.02	29.00	7.79	6.60	0.00
3.50	0.32	0.01	0.09	29.50	7.79	6.60	0.00
4.00	0.37	0.02	0.17	30.00	7.79	6.60	0.00
4.50	0.43	0.03	0.24	30.50	7.79	6.60	0.00
5.00	0.49	0.05	0.33	31.00	7.79	6.60	0.00
5.50	0.56	0.08	0.42	31.50	7.79	6.60	0.00
6.00	0.62	0.11	0.52	32.00	7.79	6.60	0.00
6.50	0.70	0.14	0.61	32.50	7.79	6.60	0.00
7.00	0.77	0.18	0.71	33.00	7.79	6.60	0.00
7.50	0.85	0.23	0.81	33.50	7.79	6.60	0.00
8.00	0.93	0.28	0.91	34.00	7.79	6.60	0.00
8.50	1.03	0.34	1.07	34.50	7.79	6.60	0.00
9.00	1.15	0.42	1.35	35.00	7.79	6.60	0.00
9.50	1.27	0.51	1.61	35.50	7.79	6.60	0.00
10.00	1.41	0.61	1.82	36.00	7.79	6.60	0.00
10.50	1.59	0.75	2.37	36.50	7.79	6.60	0.00
11.00	1.83	0.95	3.27	37.00	7.79	6.60	0.00
11.50	2.20	1.27	5.05	37.50	7.79	6.60	0.00
12.00	5.16	4.04	31.59	38.00	7.79	6.60	0.00
12.50	5.73	4.58	23.61	38.50	7.79	6.60	0.00
13.00	6.01	4.86	7.03	39.00	7.79	6.60	0.00
13.50	6.22	5.06	4.20	39.50	7.79	6.60	0.00
14.00	6.39	5.22	3.20	40.00	7.79	6.60	0.00
14.50	6.53	5.36	2.60	40.50	7.79	6.60	0.00
15.00	6.65	5.48	2.32	41.00	7.79	6.60	0.00
15.50	6.76	5.59	2.07	41.50	7.79	6.60	0.00
16.00	6.86	5.68	1.82	42.00	7.79	6.60	0.00
16.50	6.94	5.77	1.62	42.50	7.79	6.60	0.00
17.00	7.02	5.85	1.52	43.00	7.79	6.60	0.00
17.50	7.10	5.92	1.43	43.50	7.79	6.60	0.00
18.00	7.17	5.99	1.34	44.00	7.79	6.60	0.00
18.50	7.24	6.06	1.26	44.50	7.79	6.60	0.00
19.00	7.31	6.12	1.17	45.00	7.79	6.60	0.00
19.50	7.36	6.18	1.08	45.50	7.79	6.60	0.00
20.00	7.42	6.23	0.99	46.00	7.79	6.60	0.00
20.50	7.47	6.28	0.92	46.50	7.79	6.60	0.00
21.00	7.52	6.33	0.90	47.00	7.79	6.60	0.00
21.50	7.56	6.38	0.88	47.50	7.79	6.60	0.00
22.00	7.61	6.42	0.86	48.00	7.79	6.60	0.00
22.50	7.66	6.47	0.85				
23.00	7.70	6.51	0.83				
23.50	7.75	6.56	0.81				
24.00	7.79	6.60	0.79				
24.50	7.79	6.60	0.20				
25.00	7.79	6.60	0.01				
25.50	7.79	6.60	0.00				

10500.039-Pond Calcs

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Type II 24-hr 25-YR Rainfall=7.79"

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Summary for Reach 2R: Grassy Swale

Inflow Area = 9.170 ac, 41.44% Impervious, Inflow Depth > 2.03" for 25-YR event
Inflow = 0.64 cfs @ 12.41 hrs, Volume= 1.549 af
Outflow = 0.64 cfs @ 12.51 hrs, Volume= 1.546 af, Atten= 0%, Lag= 6.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.76 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.65 fps, Avg. Travel Time= 3.9 min

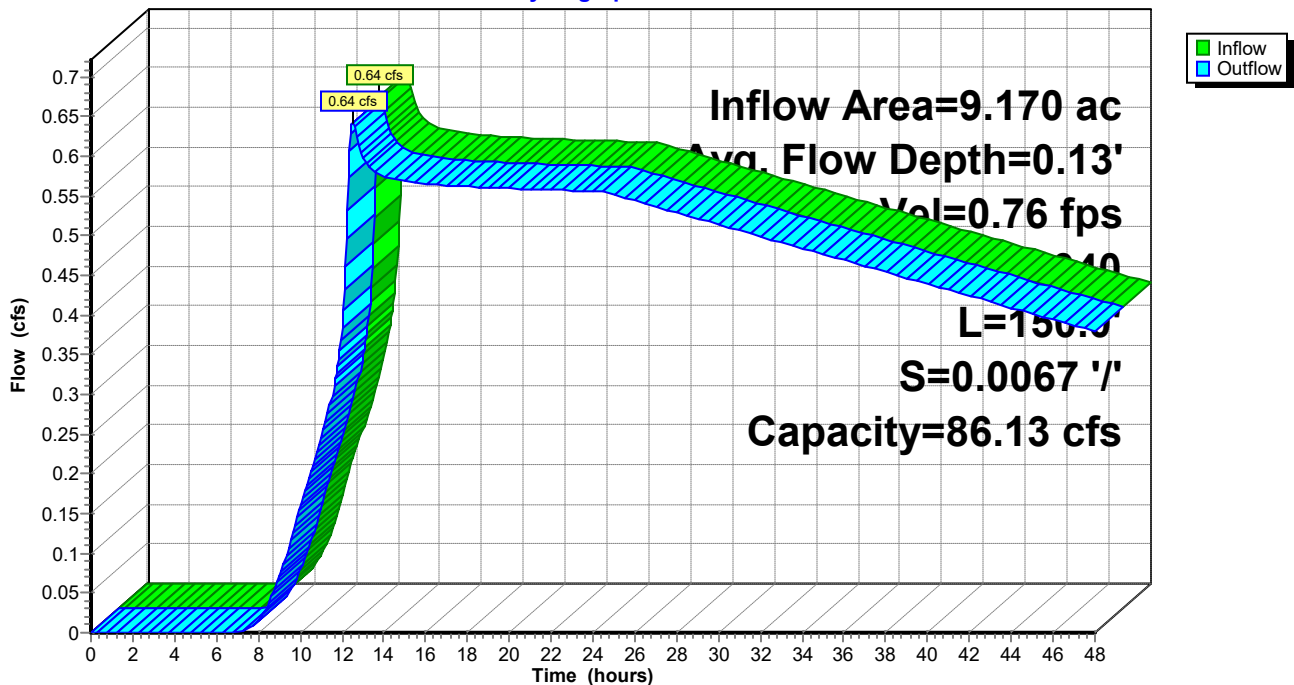
Peak Storage= 127 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 86.13 cfs

6.00' x 2.00' deep channel, n= 0.040
Side Slope Z-value= 3.0 '/' Top Width= 18.00'
Length= 150.0' Slope= 0.0067 '/'
Inlet Invert= 280.00', Outlet Invert= 279.00'

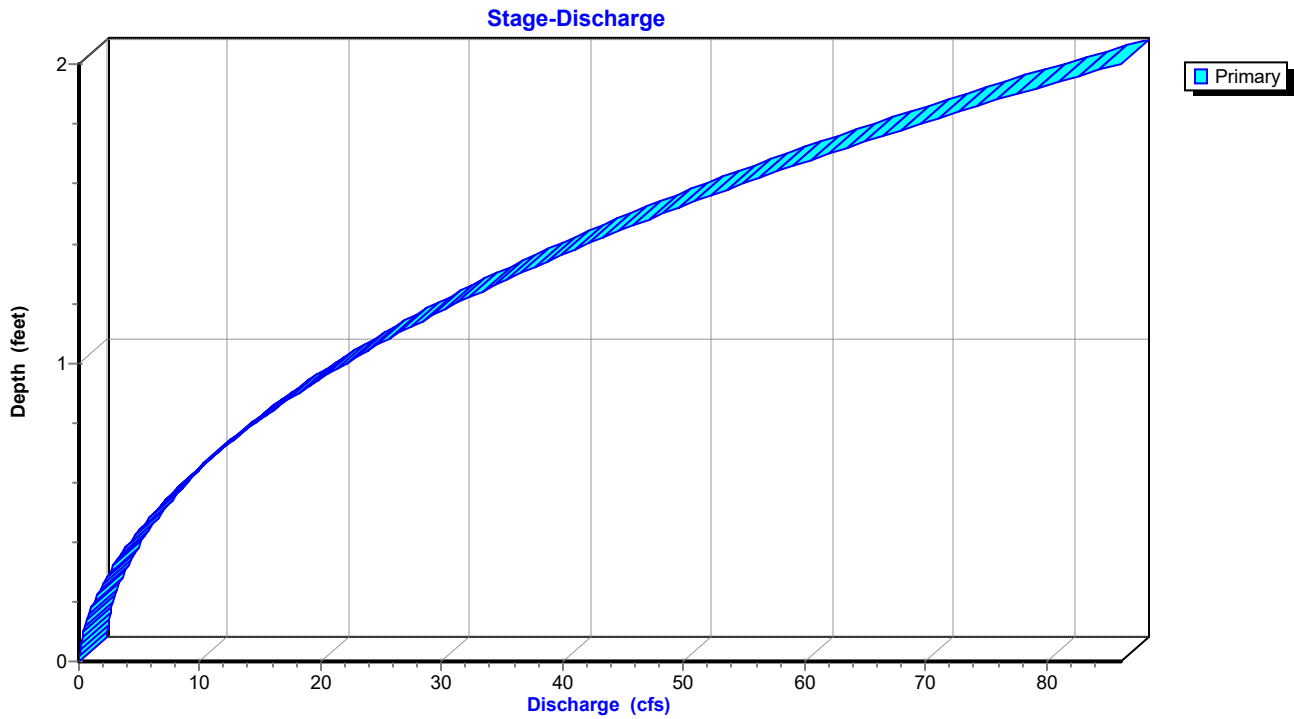


Reach 2R: Grassy Swale

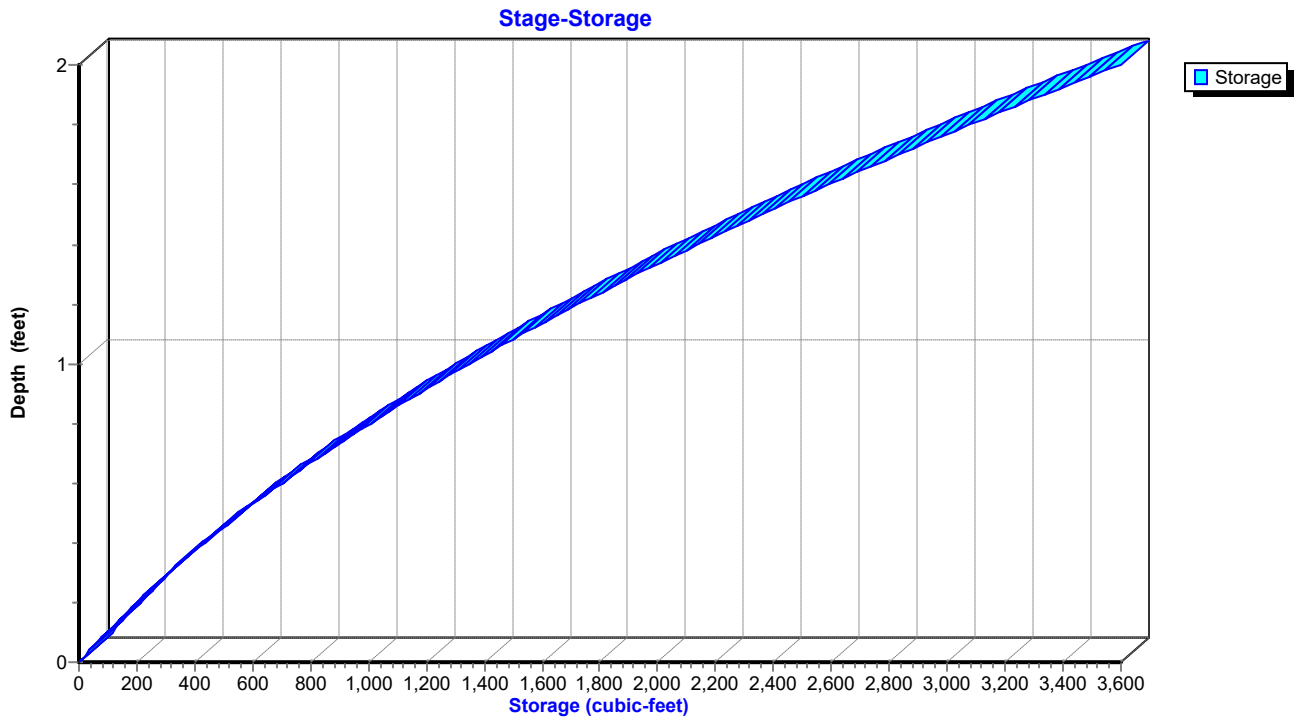
Hydrograph



Reach 2R: Grassy Swale



Reach 2R: Grassy Swale



10500.039-Pond Calcs

Type II 24-hr 25-YR Rainfall=7.79"

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Hydrograph for Reach 2R: Grassy Swale

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	280.00	0.00
1.00	0.00	0	280.00	0.00
2.00	0.00	0	280.00	0.00
3.00	0.00	0	280.00	0.00
4.00	0.00	0	280.00	0.00
5.00	0.00	0	280.00	0.00
6.00	0.00	0	280.00	0.00
7.00	0.00	1	280.00	0.00
8.00	0.02	12	280.01	0.02
9.00	0.08	33	280.04	0.07
10.00	0.17	55	280.06	0.16
11.00	0.25	70	280.08	0.24
12.00	0.43	96	280.10	0.38
13.00	0.59	122	280.13	0.60
14.00	0.57	119	280.12	0.57
15.00	0.57	118	280.12	0.57
16.00	0.57	118	280.12	0.57
17.00	0.56	117	280.12	0.56
18.00	0.56	117	280.12	0.56
19.00	0.56	117	280.12	0.56
20.00	0.56	117	280.12	0.56
21.00	0.56	117	280.12	0.56
22.00	0.56	117	280.12	0.56
23.00	0.56	116	280.12	0.56
24.00	0.56	116	280.12	0.56
25.00	0.55	116	280.12	0.55
26.00	0.54	115	280.12	0.54
27.00	0.54	114	280.12	0.54
28.00	0.53	113	280.12	0.53
29.00	0.52	112	280.12	0.52
30.00	0.51	111	280.12	0.51
31.00	0.51	110	280.12	0.51
32.00	0.50	109	280.11	0.50
33.00	0.49	108	280.11	0.49
34.00	0.48	107	280.11	0.48
35.00	0.48	105	280.11	0.48
36.00	0.47	104	280.11	0.47
37.00	0.46	103	280.11	0.46
38.00	0.45	102	280.11	0.45
39.00	0.45	101	280.11	0.45
40.00	0.44	100	280.11	0.44
41.00	0.43	99	280.10	0.43
42.00	0.42	98	280.10	0.42
43.00	0.42	97	280.10	0.42
44.00	0.41	96	280.10	0.41
45.00	0.40	95	280.10	0.40
46.00	0.39	94	280.10	0.39
47.00	0.39	93	280.10	0.39
48.00	0.38	92	280.10	0.38

10500.039-Pond Calcs

Type II 24-hr 25-YR Rainfall=7.79"

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Stage-Discharge for Reach 2R: Grassy Swale

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
280.00	0.00	0.00	281.04	2.51	23.84
280.02	0.22	0.03	281.06	2.54	24.71
280.04	0.35	0.09	281.08	2.57	25.60
280.06	0.46	0.17	281.10	2.59	26.51
280.08	0.55	0.27	281.12	2.62	27.43
280.10	0.63	0.40	281.14	2.64	28.37
280.12	0.71	0.54	281.16	2.67	29.33
280.14	0.78	0.70	281.18	2.69	30.31
280.16	0.85	0.88	281.20	2.72	31.30
280.18	0.91	1.07	281.22	2.74	32.31
280.20	0.97	1.28	281.24	2.77	33.34
280.22	1.03	1.51	281.26	2.79	34.38
280.24	1.09	1.75	281.28	2.81	35.44
280.26	1.14	2.01	281.30	2.84	36.52
280.28	1.19	2.28	281.32	2.86	37.62
280.30	1.24	2.57	281.34	2.89	38.74
280.32	1.29	2.87	281.36	2.91	39.87
280.34	1.34	3.19	281.38	2.93	41.02
280.36	1.38	3.53	281.40	2.95	42.19
280.38	1.43	3.87	281.42	2.98	43.38
280.40	1.47	4.24	281.44	3.00	44.59
280.42	1.51	4.61	281.46	3.02	45.81
280.44	1.55	5.01	281.48	3.05	47.05
280.46	1.59	5.41	281.50	3.07	48.31
280.48	1.63	5.83	281.52	3.09	49.59
280.50	1.67	6.27	281.54	3.11	50.89
280.52	1.71	6.72	281.56	3.13	52.21
280.54	1.75	7.19	281.58	3.16	53.55
280.56	1.78	7.67	281.60	3.18	54.90
280.58	1.82	8.17	281.62	3.20	56.28
280.60	1.85	8.68	281.64	3.22	57.67
280.62	1.89	9.20	281.66	3.24	59.08
280.64	1.92	9.74	281.68	3.26	60.52
280.66	1.96	10.30	281.70	3.28	61.97
280.68	1.99	10.87	281.72	3.30	63.44
280.70	2.02	11.46	281.74	3.33	64.93
280.72	2.05	12.06	281.76	3.35	66.44
280.74	2.08	12.68	281.78	3.37	67.97
280.76	2.12	13.31	281.80	3.39	69.52
280.78	2.15	13.96	281.82	3.41	71.09
280.80	2.18	14.62	281.84	3.43	72.68
280.82	2.21	15.30	281.86	3.45	74.29
280.84	2.24	16.00	281.88	3.47	75.92
280.86	2.26	16.71	281.90	3.49	77.57
280.88	2.29	17.44	281.92	3.51	79.24
280.90	2.32	18.18	281.94	3.53	80.93
280.92	2.35	18.94	281.96	3.55	82.64
280.94	2.38	19.71	281.98	3.57	84.38
280.96	2.41	20.51	282.00	3.59	86.13
280.98	2.43	21.31			
281.00	2.46	22.14			
281.02	2.49	22.98			

10500.039-Pond Calcs

Type II 24-hr 25-YR Rainfall=7.79"

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Stage-Area-Storage for Reach 2R: Grassy Swale

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
280.00	0.0	0	281.04	9.5	1,423
280.02	0.1	18	281.06	9.7	1,460
280.04	0.2	37	281.08	10.0	1,497
280.06	0.4	56	281.10	10.2	1,535
280.08	0.5	75	281.12	10.5	1,572
280.10	0.6	95	281.14	10.7	1,611
280.12	0.8	114	281.16	11.0	1,650
280.14	0.9	135	281.18	11.3	1,689
280.16	1.0	156	281.20	11.5	1,728
280.18	1.2	177	281.22	11.8	1,768
280.20	1.3	198	281.24	12.1	1,808
280.22	1.5	220	281.26	12.3	1,848
280.24	1.6	242	281.28	12.6	1,889
280.26	1.8	264	281.30	12.9	1,931
280.28	1.9	287	281.32	13.1	1,972
280.30	2.1	311	281.34	13.4	2,014
280.32	2.2	334	281.36	13.7	2,056
280.34	2.4	358	281.38	14.0	2,099
280.36	2.5	382	281.40	14.3	2,142
280.38	2.7	407	281.42	14.6	2,185
280.40	2.9	432	281.44	14.9	2,229
280.42	3.0	457	281.46	15.2	2,273
280.44	3.2	483	281.48	15.5	2,318
280.46	3.4	509	281.50	15.8	2,363
280.48	3.6	536	281.52	16.1	2,408
280.50	3.8	563	281.54	16.4	2,453
280.52	3.9	590	281.56	16.7	2,499
280.54	4.1	617	281.58	17.0	2,545
280.56	4.3	645	281.60	17.3	2,592
280.58	4.5	673	281.62	17.6	2,639
280.60	4.7	702	281.64	17.9	2,686
280.62	4.9	731	281.66	18.2	2,734
280.64	5.1	760	281.68	18.5	2,782
280.66	5.3	790	281.70	18.9	2,830
280.68	5.5	820	281.72	19.2	2,879
280.70	5.7	851	281.74	19.5	2,928
280.72	5.9	881	281.76	19.9	2,978
280.74	6.1	912	281.78	20.2	3,028
280.76	6.3	944	281.80	20.5	3,078
280.78	6.5	976	281.82	20.9	3,129
280.80	6.7	1,008	281.84	21.2	3,180
280.82	6.9	1,041	281.86	21.5	3,231
280.84	7.2	1,074	281.88	21.9	3,282
280.86	7.4	1,107	281.90	22.2	3,335
280.88	7.6	1,140	281.92	22.6	3,387
280.90	7.8	1,175	281.94	22.9	3,440
280.92	8.1	1,209	281.96	23.3	3,493
280.94	8.3	1,244	281.98	23.6	3,546
280.96	8.5	1,279	282.00	24.0	3,600
280.98	8.8	1,314			
281.00	9.0	1,350			
281.02	9.2	1,386			

10500.039-Pond Calcs

Type II 24-hr 25-YR Rainfall=7.79"

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Summary for Pond 1P: Pond 1

Inflow Area = 9.170 ac, 41.44% Impervious, Inflow Depth = 6.60" for 25-YR event
 Inflow = 53.84 cfs @ 12.19 hrs, Volume= 5.043 af
 Outflow = 33.22 cfs @ 12.41 hrs, Volume= 4.062 af, Atten= 38%, Lag= 13.2 min
 Primary = 0.64 cfs @ 12.41 hrs, Volume= 1.549 af
 Secondary = 32.57 cfs @ 12.41 hrs, Volume= 2.512 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 933.62' @ 12.41 hrs Surf.Area= 0 sf Storage= 101,445 cf

Plug-Flow detention time= 449.0 min calculated for 4.058 af (80% of inflow)
 Center-of-Mass det. time= 372.0 min (1,164.2 - 792.2)

Volume	Invert	Avail.Storage	Storage Description
#1	931.00'	171,024 cf	Custom Stage Data Listed below

Elevation (feet)	Cum.Store (cubic-feet)
931.00	0
932.00	39,402
933.00	81,879
934.00	113,651
935.00	171,024

Device	Routing	Invert	Outlet Devices
#1	Primary	931.10'	4.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	933.00'	25.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.64 cfs @ 12.41 hrs HW=933.61' (Free Discharge)
 ↑1=**Orifice/Grate** (Orifice Controls 0.64 cfs @ 7.38 fps)

Secondary OutFlow Max=32.33 cfs @ 12.41 hrs HW=933.61' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir** (Weir Controls 32.33 cfs @ 2.11 fps)

10500.039-Pond Calcs

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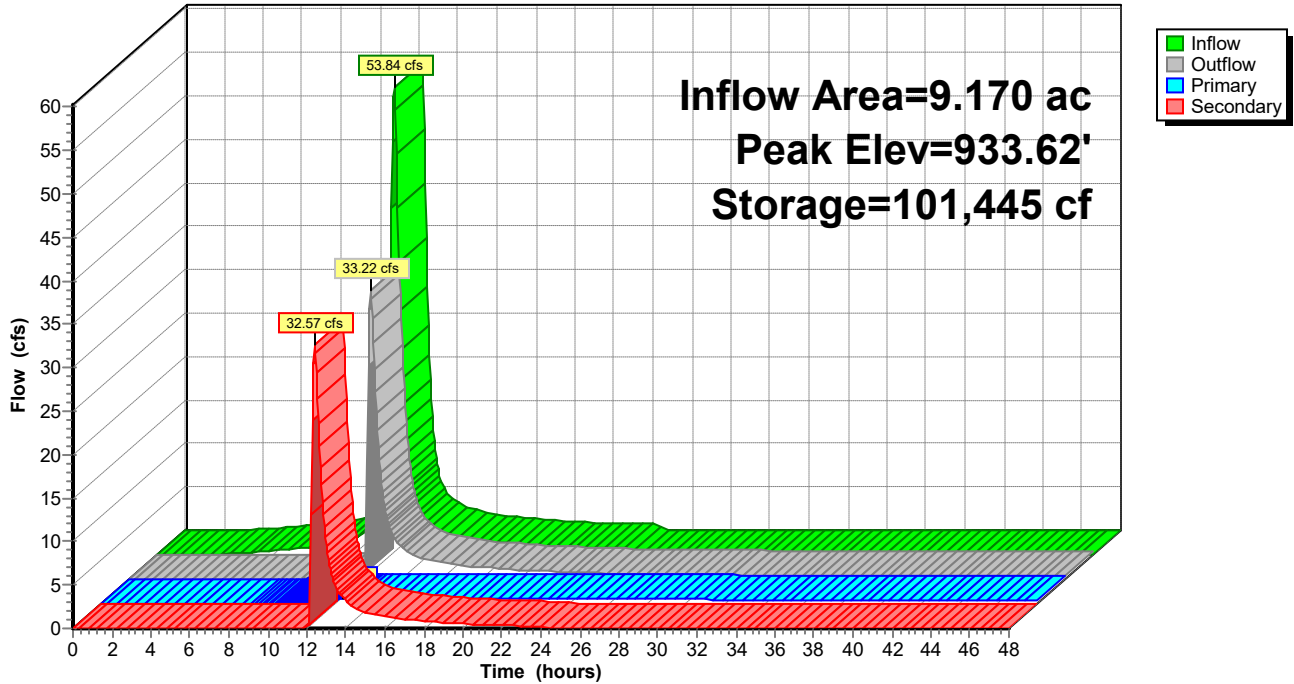
Type II 24-hr 25-YR Rainfall=7.79"

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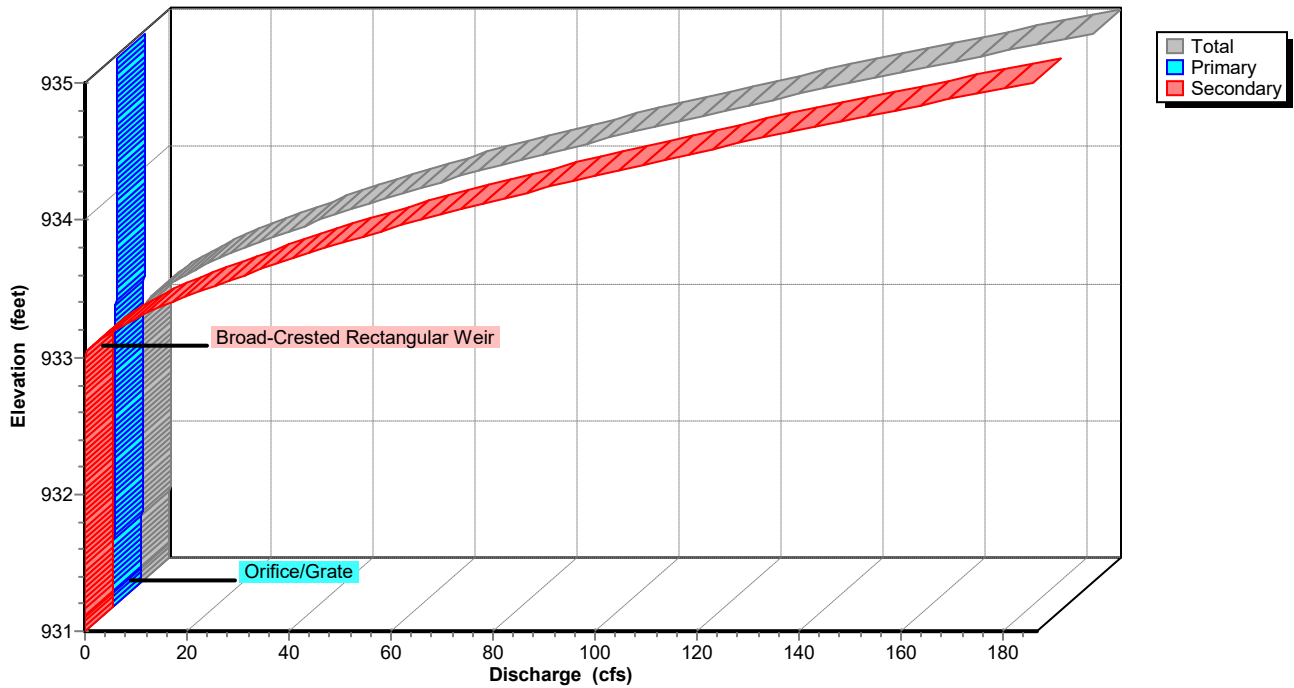
Pond 1P: Pond 1

Hydrograph



Pond 1P: Pond 1

Stage-Discharge



10500.039-Pond Calcs

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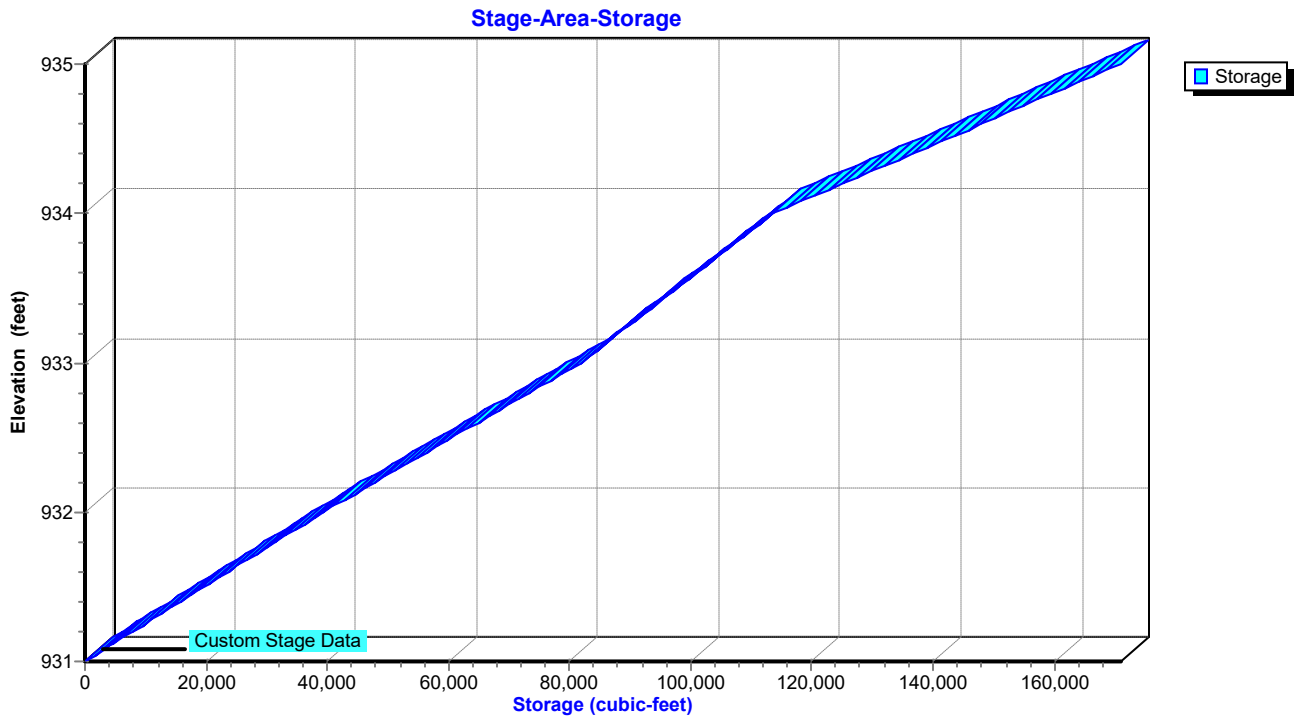
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Pond 1P: Pond 1



10500.039-Pond Calcs

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Hydrograph for Pond 1P: Pond 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	931.00	0.00	0.00	0.00
1.00	0.00	0	931.00	0.00	0.00	0.00
2.00	0.00	0	931.00	0.00	0.00	0.00
3.00	0.02	7	931.00	0.00	0.00	0.00
4.00	0.17	328	931.01	0.00	0.00	0.00
5.00	0.33	1,211	931.03	0.00	0.00	0.00
6.00	0.52	2,732	931.07	0.00	0.00	0.00
7.00	0.71	4,944	931.13	0.00	0.00	0.00
8.00	0.91	7,834	931.20	0.02	0.02	0.00
9.00	1.35	11,586	931.29	0.08	0.08	0.00
10.00	1.82	16,875	931.43	0.17	0.17	0.00
11.00	3.27	24,851	931.63	0.25	0.25	0.00
12.00	31.59	52,029	932.30	0.43	0.43	0.00
13.00	7.03	90,487	933.27	10.08	0.59	9.49
14.00	3.20	85,977	933.13	3.70	0.57	3.12
15.00	2.32	84,831	933.09	2.49	0.57	1.93
16.00	1.82	84,291	933.08	1.98	0.57	1.42
17.00	1.52	83,809	933.06	1.61	0.56	1.04
18.00	1.34	83,553	933.05	1.41	0.56	0.85
19.00	1.17	83,325	933.05	1.23	0.56	0.67
20.00	0.99	83,091	933.04	1.07	0.56	0.51
21.00	0.90	82,816	933.03	0.95	0.56	0.40
22.00	0.86	82,676	933.03	0.89	0.56	0.34
23.00	0.83	82,582	933.02	0.85	0.56	0.30
24.00	0.79	82,497	933.02	0.82	0.56	0.26
25.00	0.01	81,235	932.98	0.55	0.55	0.00
26.00	0.00	79,272	932.94	0.54	0.54	0.00
27.00	0.00	77,329	932.89	0.54	0.54	0.00
28.00	0.00	75,414	932.85	0.53	0.53	0.00
29.00	0.00	73,525	932.80	0.52	0.52	0.00
30.00	0.00	71,664	932.76	0.51	0.51	0.00
31.00	0.00	69,829	932.72	0.51	0.51	0.00
32.00	0.00	68,021	932.67	0.50	0.50	0.00
33.00	0.00	66,240	932.63	0.49	0.49	0.00
34.00	0.00	64,486	932.59	0.48	0.48	0.00
35.00	0.00	62,759	932.55	0.48	0.48	0.00
36.00	0.00	61,059	932.51	0.47	0.47	0.00
37.00	0.00	59,386	932.47	0.46	0.46	0.00
38.00	0.00	57,740	932.43	0.45	0.45	0.00
39.00	0.00	56,121	932.39	0.45	0.45	0.00
40.00	0.00	54,528	932.36	0.44	0.44	0.00
41.00	0.00	52,963	932.32	0.43	0.43	0.00
42.00	0.00	51,425	932.28	0.42	0.42	0.00
43.00	0.00	49,913	932.25	0.42	0.42	0.00
44.00	0.00	48,429	932.21	0.41	0.41	0.00
45.00	0.00	46,971	932.18	0.40	0.40	0.00
46.00	0.00	45,540	932.14	0.39	0.39	0.00
47.00	0.00	44,137	932.11	0.39	0.39	0.00
48.00	0.00	42,760	932.08	0.38	0.38	0.00

10500.039-Pond Calcs

Type II 24-hr 25-YR Rainfall=7.79"

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Stage-Discharge for Pond 1P: Pond 1

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
931.00	0.00	0.00	0.00	933.60	32.01	0.64	31.37
931.05	0.00	0.00	0.00	933.65	35.83	0.65	35.18
931.10	0.00	0.00	0.00	933.70	39.75	0.66	39.09
931.15	0.01	0.01	0.00	933.75	43.77	0.66	43.11
931.20	0.02	0.02	0.00	933.80	47.89	0.67	47.23
931.25	0.05	0.05	0.00	933.85	52.35	0.68	51.67
931.30	0.08	0.08	0.00	933.90	56.93	0.68	56.25
931.35	0.12	0.12	0.00	933.95	61.63	0.69	60.94
931.40	0.15	0.15	0.00	934.00	66.44	0.69	65.75
931.45	0.18	0.18	0.00	934.05	71.51	0.70	70.81
931.50	0.20	0.20	0.00	934.10	76.71	0.71	76.00
931.55	0.22	0.22	0.00	934.15	82.03	0.71	81.32
931.60	0.24	0.24	0.00	934.20	87.48	0.72	86.76
931.65	0.26	0.26	0.00	934.25	92.96	0.73	92.24
931.70	0.28	0.28	0.00	934.30	98.56	0.73	97.83
931.75	0.29	0.29	0.00	934.35	104.26	0.74	103.52
931.80	0.31	0.31	0.00	934.40	110.07	0.74	109.33
931.85	0.32	0.32	0.00	934.45	115.88	0.75	115.13
931.90	0.33	0.33	0.00	934.50	121.78	0.76	121.02
931.95	0.35	0.35	0.00	934.55	127.76	0.76	127.00
932.00	0.36	0.36	0.00	934.60	133.84	0.77	133.07
932.05	0.37	0.37	0.00	934.65	140.13	0.77	139.35
932.10	0.38	0.38	0.00	934.70	146.52	0.78	145.74
932.15	0.39	0.39	0.00	934.75	153.00	0.78	152.21
932.20	0.41	0.41	0.00	934.80	159.57	0.79	158.78
932.25	0.42	0.42	0.00	934.85	166.24	0.80	165.44
932.30	0.43	0.43	0.00	934.90	173.00	0.80	172.20
932.35	0.44	0.44	0.00	934.95	179.85	0.81	179.04
932.40	0.45	0.45	0.00	935.00	186.78	0.81	185.97
932.45	0.46	0.46	0.00				
932.50	0.47	0.47	0.00				
932.55	0.48	0.48	0.00				
932.60	0.49	0.49	0.00				
932.65	0.49	0.49	0.00				
932.70	0.50	0.50	0.00				
932.75	0.51	0.51	0.00				
932.80	0.52	0.52	0.00				
932.85	0.53	0.53	0.00				
932.90	0.54	0.54	0.00				
932.95	0.55	0.55	0.00				
933.00	0.55	0.55	0.00				
933.05	1.31	0.56	0.75				
933.10	2.69	0.57	2.12				
933.15	4.47	0.58	3.89				
933.20	6.58	0.58	5.99				
933.25	8.98	0.59	8.39				
933.30	11.65	0.60	11.05				
933.35	14.56	0.61	13.95				
933.40	17.69	0.61	17.08				
933.45	21.00	0.62	20.38				
933.50	24.49	0.63	23.86				
933.55	28.17	0.63	27.53				

10500.039-Pond Calcs

Type II 24-hr 25-YR Rainfall=7.79"

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Stage-Area-Storage for Pond 1P: Pond 1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
931.00	0	933.60	100,942
931.05	1,970	933.65	102,531
931.10	3,940	933.70	104,119
931.15	5,910	933.75	105,708
931.20	7,880	933.80	107,297
931.25	9,851	933.85	108,885
931.30	11,821	933.90	110,474
931.35	13,791	933.95	112,062
931.40	15,761	934.00	113,651
931.45	17,731	934.05	116,520
931.50	19,701	934.10	119,388
931.55	21,671	934.15	122,257
931.60	23,641	934.20	125,126
931.65	25,611	934.25	127,994
931.70	27,581	934.30	130,863
931.75	29,552	934.35	133,732
931.80	31,522	934.40	136,600
931.85	33,492	934.45	139,469
931.90	35,462	934.50	142,338
931.95	37,432	934.55	145,206
932.00	39,402	934.60	148,075
932.05	41,526	934.65	150,943
932.10	43,650	934.70	153,812
932.15	45,774	934.75	156,681
932.20	47,897	934.80	159,549
932.25	50,021	934.85	162,418
932.30	52,145	934.90	165,287
932.35	54,269	934.95	168,155
932.40	56,393	935.00	171,024
932.45	58,517		
932.50	60,641		
932.55	62,764		
932.60	64,888		
932.65	67,012		
932.70	69,136		
932.75	71,260		
932.80	73,384		
932.85	75,507		
932.90	77,631		
932.95	79,755		
933.00	81,879		
933.05	83,468		
933.10	85,056		
933.15	86,645		
933.20	88,233		
933.25	89,822		
933.30	91,411		
933.35	92,999		
933.40	94,588		
933.45	96,176		
933.50	97,765		
933.55	99,354		

10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: Development Area Runoff Area=9.170 ac 41.44% Impervious Runoff Depth=9.57"
Flow Length=650' Tc=26.5 min CN=90 Runoff=76.63 cfs 7.315 af

Reach 2R: Grassy Swale Avg. Flow Depth=0.14' Max Vel=0.78 fps Inflow=0.69 cfs 1.610 af
n=0.040 L=150.0' S=0.0067 '/' Capacity=86.13 cfs Outflow=0.69 cfs 1.606 af

Pond 1P: Pond 1 Peak Elev=933.99' Storage=113,408 cf Inflow=76.63 cfs 7.315 af
Primary=0.69 cfs 1.610 af Secondary=65.01 cfs 4.717 af Outflow=65.71 cfs 6.327 af

Total Runoff Area = 9.170 ac Runoff Volume = 7.315 af Average Runoff Depth = 9.57"
58.56% Pervious = 5.370 ac 41.44% Impervious = 3.800 ac

10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Summary for Subcatchment 2S: Development Area

Runoff = 76.63 cfs @ 12.19 hrs, Volume= 7.315 af, Depth= 9.57"

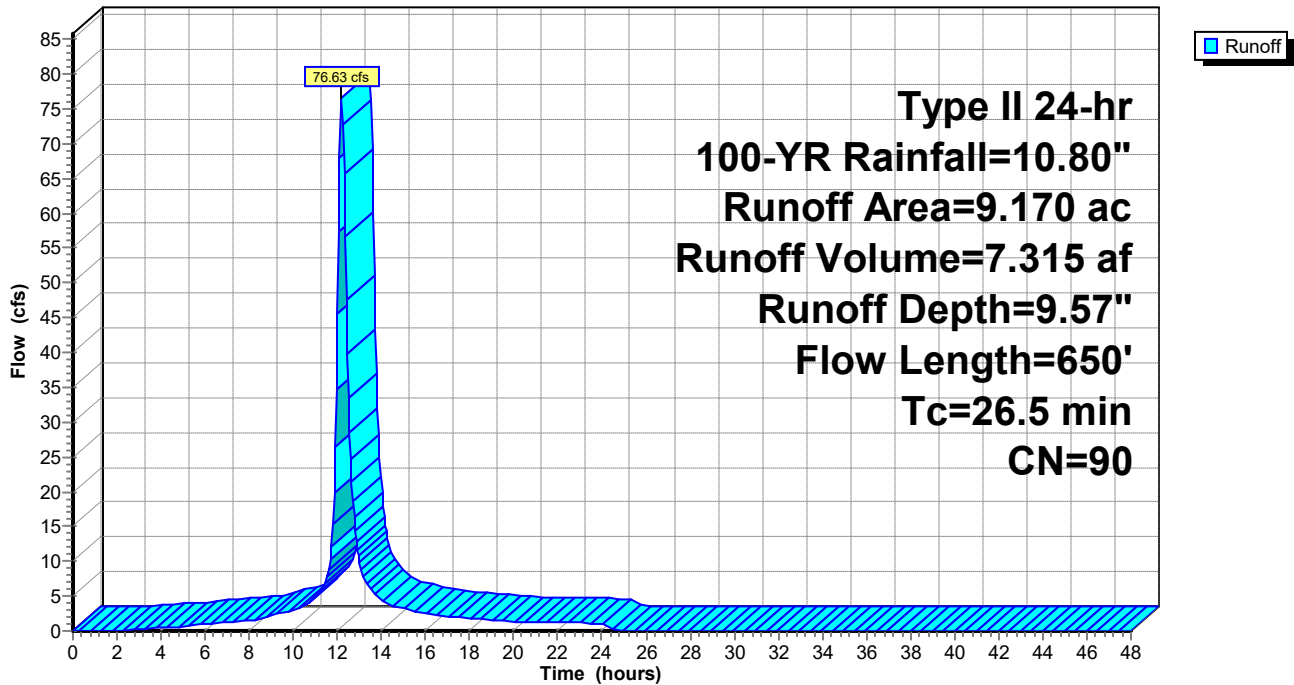
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-YR Rainfall=10.80"

Area (ac)	CN	Description
* 3.800	98	Paved parking,
5.370	84	50-75% Grass cover, Fair, HSG D
9.170	90	Weighted Average
5.370		58.56% Pervious Area
3.800		41.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0050	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.88"
10.1	300	0.0050	0.49		Shallow Concentrated Flow, SHALLOW Short Grass Pasture Kv= 7.0 fps
0.9	250	0.0500	4.54		Shallow Concentrated Flow, SHALLOW-PAVED Paved Kv= 20.3 fps
26.5	650	Total			

Subcatchment 2S: Development Area

Hydrograph



10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Hydrograph for Subcatchment 2S: Development Area

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.00	10.80	9.57	0.00
0.50	0.06	0.00	0.00	26.50	10.80	9.57	0.00
1.00	0.11	0.00	0.00	27.00	10.80	9.57	0.00
1.50	0.17	0.00	0.00	27.50	10.80	9.57	0.00
2.00	0.24	0.00	0.00	28.00	10.80	9.57	0.00
2.50	0.30	0.01	0.06	28.50	10.80	9.57	0.00
3.00	0.37	0.02	0.19	29.00	10.80	9.57	0.00
3.50	0.44	0.04	0.31	29.50	10.80	9.57	0.00
4.00	0.52	0.06	0.43	30.00	10.80	9.57	0.00
4.50	0.60	0.09	0.55	30.50	10.80	9.57	0.00
5.00	0.68	0.13	0.68	31.00	10.80	9.57	0.00
5.50	0.77	0.18	0.82	31.50	10.80	9.57	0.00
6.00	0.86	0.23	0.96	32.00	10.80	9.57	0.00
6.50	0.96	0.30	1.10	32.50	10.80	9.57	0.00
7.00	1.07	0.37	1.24	33.00	10.80	9.57	0.00
7.50	1.18	0.44	1.38	33.50	10.80	9.57	0.00
8.00	1.30	0.53	1.52	34.00	10.80	9.57	0.00
8.50	1.43	0.63	1.74	34.50	10.80	9.57	0.00
9.00	1.59	0.75	2.16	35.00	10.80	9.57	0.00
9.50	1.76	0.89	2.53	35.50	10.80	9.57	0.00
10.00	1.95	1.06	2.82	36.00	10.80	9.57	0.00
10.50	2.20	1.27	3.62	36.50	10.80	9.57	0.00
11.00	2.54	1.56	4.93	37.00	10.80	9.57	0.00
11.50	3.06	2.04	7.49	37.50	10.80	9.57	0.00
12.00	7.16	5.98	45.47	38.00	10.80	9.57	0.00
12.50	7.94	6.74	33.40	38.50	10.80	9.57	0.00
13.00	8.34	7.14	9.88	39.00	10.80	9.57	0.00
13.50	8.63	7.43	5.90	39.50	10.80	9.57	0.00
14.00	8.86	7.65	4.49	40.00	10.80	9.57	0.00
14.50	9.05	7.84	3.64	40.50	10.80	9.57	0.00
15.00	9.22	8.01	3.24	41.00	10.80	9.57	0.00
15.50	9.37	8.16	2.90	41.50	10.80	9.57	0.00
16.00	9.50	8.29	2.55	42.00	10.80	9.57	0.00
16.50	9.62	8.41	2.27	42.50	10.80	9.57	0.00
17.00	9.74	8.52	2.13	43.00	10.80	9.57	0.00
17.50	9.85	8.63	2.00	43.50	10.80	9.57	0.00
18.00	9.95	8.73	1.88	44.00	10.80	9.57	0.00
18.50	10.04	8.82	1.76	44.50	10.80	9.57	0.00
19.00	10.13	8.91	1.63	45.00	10.80	9.57	0.00
19.50	10.21	8.99	1.51	45.50	10.80	9.57	0.00
20.00	10.28	9.06	1.39	46.00	10.80	9.57	0.00
20.50	10.35	9.13	1.29	46.50	10.80	9.57	0.00
21.00	10.42	9.20	1.26	47.00	10.80	9.57	0.00
21.50	10.49	9.26	1.23	47.50	10.80	9.57	0.00
22.00	10.55	9.33	1.21	48.00	10.80	9.57	0.00
22.50	10.62	9.39	1.18				
23.00	10.68	9.45	1.16				
23.50	10.74	9.51	1.13				
24.00	10.80	9.57	1.11				
24.50	10.80	9.57	0.28				
25.00	10.80	9.57	0.02				
25.50	10.80	9.57	0.00				

10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Summary for Reach 2R: Grassy Swale

Inflow Area = 9.170 ac, 41.44% Impervious, Inflow Depth > 2.11" for 100-YR event
 Inflow = 0.69 cfs @ 12.30 hrs, Volume= 1.610 af
 Outflow = 0.69 cfs @ 12.40 hrs, Volume= 1.606 af, Atten= 0%, Lag= 5.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.78 fps, Min. Travel Time= 3.2 min
 Avg. Velocity = 0.65 fps, Avg. Travel Time= 3.8 min

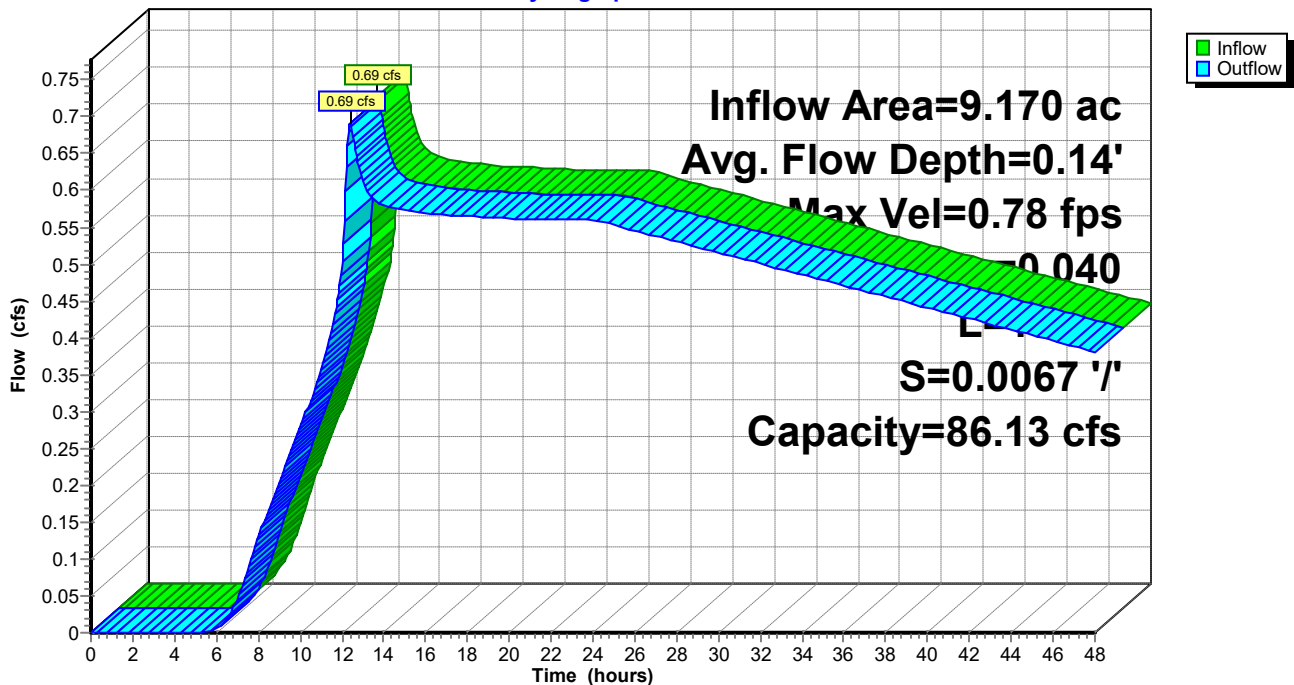
Peak Storage= 134 cf @ 12.34 hrs
 Average Depth at Peak Storage= 0.14'
 Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 86.13 cfs

6.00' x 2.00' deep channel, n= 0.040
 Side Slope Z-value= 3.0 ' / ' Top Width= 18.00'
 Length= 150.0' Slope= 0.0067 ' / '
 Inlet Invert= 280.00', Outlet Invert= 279.00'

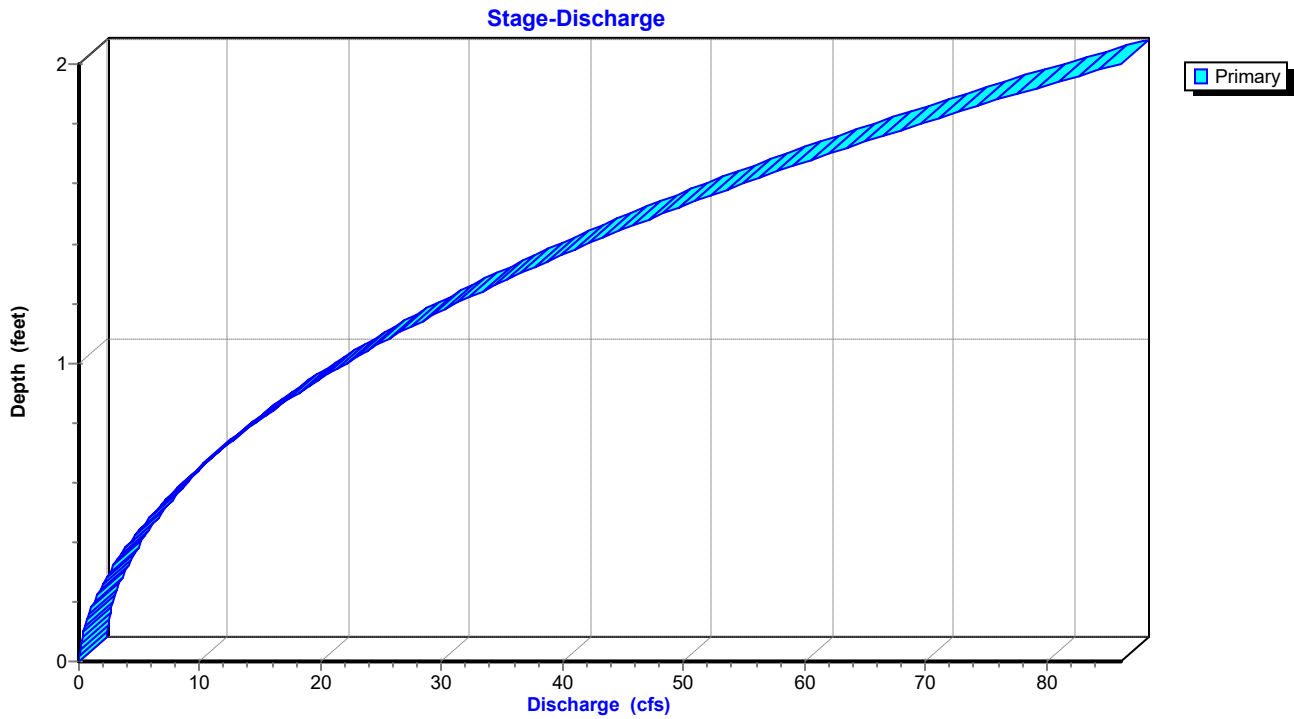


Reach 2R: Grassy Swale

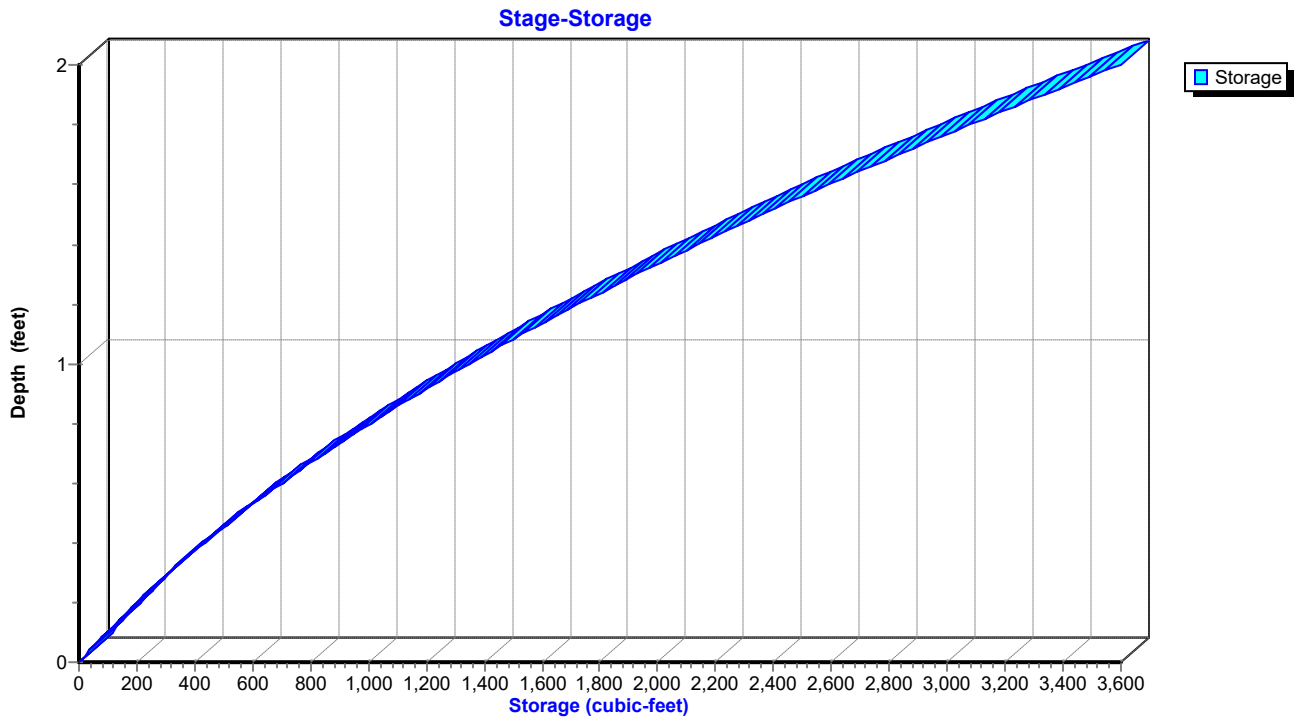
Hydrograph



Reach 2R: Grassy Swale



Reach 2R: Grassy Swale



10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Hydrograph for Reach 2R: Grassy Swale

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	280.00	0.00
1.00	0.00	0	280.00	0.00
2.00	0.00	0	280.00	0.00
3.00	0.00	0	280.00	0.00
4.00	0.00	0	280.00	0.00
5.00	0.00	0	280.00	0.00
6.00	0.01	4	280.00	0.01
7.00	0.06	26	280.03	0.05
8.00	0.14	47	280.05	0.13
9.00	0.21	63	280.07	0.20
10.00	0.29	76	280.08	0.28
11.00	0.37	89	280.09	0.36
12.00	0.55	113	280.12	0.50
13.00	0.60	123	280.13	0.61
14.00	0.58	119	280.12	0.58
15.00	0.57	118	280.12	0.57
16.00	0.57	118	280.12	0.57
17.00	0.57	118	280.12	0.57
18.00	0.57	118	280.12	0.57
19.00	0.56	117	280.12	0.56
20.00	0.56	117	280.12	0.56
21.00	0.56	117	280.12	0.56
22.00	0.56	117	280.12	0.56
23.00	0.56	117	280.12	0.56
24.00	0.56	117	280.12	0.56
25.00	0.55	116	280.12	0.55
26.00	0.54	115	280.12	0.55
27.00	0.54	114	280.12	0.54
28.00	0.53	113	280.12	0.53
29.00	0.52	112	280.12	0.52
30.00	0.51	111	280.12	0.52
31.00	0.51	110	280.12	0.51
32.00	0.50	109	280.11	0.50
33.00	0.49	108	280.11	0.49
34.00	0.49	107	280.11	0.49
35.00	0.48	106	280.11	0.48
36.00	0.47	105	280.11	0.47
37.00	0.46	104	280.11	0.46
38.00	0.46	103	280.11	0.46
39.00	0.45	102	280.11	0.45
40.00	0.44	100	280.11	0.44
41.00	0.43	99	280.10	0.43
42.00	0.43	98	280.10	0.43
43.00	0.42	97	280.10	0.42
44.00	0.41	96	280.10	0.41
45.00	0.40	95	280.10	0.40
46.00	0.40	94	280.10	0.40
47.00	0.39	93	280.10	0.39
48.00	0.38	92	280.10	0.38

10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Stage-Discharge for Reach 2R: Grassy Swale

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
280.00	0.00	0.00	281.04	2.51	23.84
280.02	0.22	0.03	281.06	2.54	24.71
280.04	0.35	0.09	281.08	2.57	25.60
280.06	0.46	0.17	281.10	2.59	26.51
280.08	0.55	0.27	281.12	2.62	27.43
280.10	0.63	0.40	281.14	2.64	28.37
280.12	0.71	0.54	281.16	2.67	29.33
280.14	0.78	0.70	281.18	2.69	30.31
280.16	0.85	0.88	281.20	2.72	31.30
280.18	0.91	1.07	281.22	2.74	32.31
280.20	0.97	1.28	281.24	2.77	33.34
280.22	1.03	1.51	281.26	2.79	34.38
280.24	1.09	1.75	281.28	2.81	35.44
280.26	1.14	2.01	281.30	2.84	36.52
280.28	1.19	2.28	281.32	2.86	37.62
280.30	1.24	2.57	281.34	2.89	38.74
280.32	1.29	2.87	281.36	2.91	39.87
280.34	1.34	3.19	281.38	2.93	41.02
280.36	1.38	3.53	281.40	2.95	42.19
280.38	1.43	3.87	281.42	2.98	43.38
280.40	1.47	4.24	281.44	3.00	44.59
280.42	1.51	4.61	281.46	3.02	45.81
280.44	1.55	5.01	281.48	3.05	47.05
280.46	1.59	5.41	281.50	3.07	48.31
280.48	1.63	5.83	281.52	3.09	49.59
280.50	1.67	6.27	281.54	3.11	50.89
280.52	1.71	6.72	281.56	3.13	52.21
280.54	1.75	7.19	281.58	3.16	53.55
280.56	1.78	7.67	281.60	3.18	54.90
280.58	1.82	8.17	281.62	3.20	56.28
280.60	1.85	8.68	281.64	3.22	57.67
280.62	1.89	9.20	281.66	3.24	59.08
280.64	1.92	9.74	281.68	3.26	60.52
280.66	1.96	10.30	281.70	3.28	61.97
280.68	1.99	10.87	281.72	3.30	63.44
280.70	2.02	11.46	281.74	3.33	64.93
280.72	2.05	12.06	281.76	3.35	66.44
280.74	2.08	12.68	281.78	3.37	67.97
280.76	2.12	13.31	281.80	3.39	69.52
280.78	2.15	13.96	281.82	3.41	71.09
280.80	2.18	14.62	281.84	3.43	72.68
280.82	2.21	15.30	281.86	3.45	74.29
280.84	2.24	16.00	281.88	3.47	75.92
280.86	2.26	16.71	281.90	3.49	77.57
280.88	2.29	17.44	281.92	3.51	79.24
280.90	2.32	18.18	281.94	3.53	80.93
280.92	2.35	18.94	281.96	3.55	82.64
280.94	2.38	19.71	281.98	3.57	84.38
280.96	2.41	20.51	282.00	3.59	86.13
280.98	2.43	21.31			
281.00	2.46	22.14			
281.02	2.49	22.98			

10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Stage-Area-Storage for Reach 2R: Grassy Swale

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
280.00	0.0	0	281.04	9.5	1,423
280.02	0.1	18	281.06	9.7	1,460
280.04	0.2	37	281.08	10.0	1,497
280.06	0.4	56	281.10	10.2	1,535
280.08	0.5	75	281.12	10.5	1,572
280.10	0.6	95	281.14	10.7	1,611
280.12	0.8	114	281.16	11.0	1,650
280.14	0.9	135	281.18	11.3	1,689
280.16	1.0	156	281.20	11.5	1,728
280.18	1.2	177	281.22	11.8	1,768
280.20	1.3	198	281.24	12.1	1,808
280.22	1.5	220	281.26	12.3	1,848
280.24	1.6	242	281.28	12.6	1,889
280.26	1.8	264	281.30	12.9	1,931
280.28	1.9	287	281.32	13.1	1,972
280.30	2.1	311	281.34	13.4	2,014
280.32	2.2	334	281.36	13.7	2,056
280.34	2.4	358	281.38	14.0	2,099
280.36	2.5	382	281.40	14.3	2,142
280.38	2.7	407	281.42	14.6	2,185
280.40	2.9	432	281.44	14.9	2,229
280.42	3.0	457	281.46	15.2	2,273
280.44	3.2	483	281.48	15.5	2,318
280.46	3.4	509	281.50	15.8	2,363
280.48	3.6	536	281.52	16.1	2,408
280.50	3.8	563	281.54	16.4	2,453
280.52	3.9	590	281.56	16.7	2,499
280.54	4.1	617	281.58	17.0	2,545
280.56	4.3	645	281.60	17.3	2,592
280.58	4.5	673	281.62	17.6	2,639
280.60	4.7	702	281.64	17.9	2,686
280.62	4.9	731	281.66	18.2	2,734
280.64	5.1	760	281.68	18.5	2,782
280.66	5.3	790	281.70	18.9	2,830
280.68	5.5	820	281.72	19.2	2,879
280.70	5.7	851	281.74	19.5	2,928
280.72	5.9	881	281.76	19.9	2,978
280.74	6.1	912	281.78	20.2	3,028
280.76	6.3	944	281.80	20.5	3,078
280.78	6.5	976	281.82	20.9	3,129
280.80	6.7	1,008	281.84	21.2	3,180
280.82	6.9	1,041	281.86	21.5	3,231
280.84	7.2	1,074	281.88	21.9	3,282
280.86	7.4	1,107	281.90	22.2	3,335
280.88	7.6	1,140	281.92	22.6	3,387
280.90	7.8	1,175	281.94	22.9	3,440
280.92	8.1	1,209	281.96	23.3	3,493
280.94	8.3	1,244	281.98	23.6	3,546
280.96	8.5	1,279	282.00	24.0	3,600
280.98	8.8	1,314			
281.00	9.0	1,350			
281.02	9.2	1,386			

10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Summary for Pond 1P: Pond 1

Inflow Area = 9.170 ac, 41.44% Impervious, Inflow Depth = 9.57" for 100-YR event
 Inflow = 76.63 cfs @ 12.19 hrs, Volume= 7.315 af
 Outflow = 65.71 cfs @ 12.30 hrs, Volume= 6.327 af, Atten= 14%, Lag= 6.9 min
 Primary = 0.69 cfs @ 12.30 hrs, Volume= 1.610 af
 Secondary = 65.01 cfs @ 12.30 hrs, Volume= 4.717 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 933.99' @ 12.30 hrs Surf.Area= 0 sf Storage= 113,408 cf

Plug-Flow detention time= 319.8 min calculated for 6.327 af (86% of inflow)
 Center-of-Mass det. time= 256.2 min (1,039.2 - 783.0)

Volume	Invert	Avail.Storage	Storage Description
#1	931.00'	171,024 cf	Custom Stage Data Listed below

Elevation (feet)	Cum.Store (cubic-feet)
931.00	0
932.00	39,402
933.00	81,879
934.00	113,651
935.00	171,024

Device	Routing	Invert	Outlet Devices
#1	Primary	931.10'	4.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	933.00'	25.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.69 cfs @ 12.30 hrs HW=933.99' (Free Discharge)
 ↑1=**Orifice/Grate** (Orifice Controls 0.69 cfs @ 7.95 fps)

Secondary OutFlow Max=64.84 cfs @ 12.30 hrs HW=933.99' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir** (Weir Controls 64.84 cfs @ 2.62 fps)

10500.039-Pond Calcs

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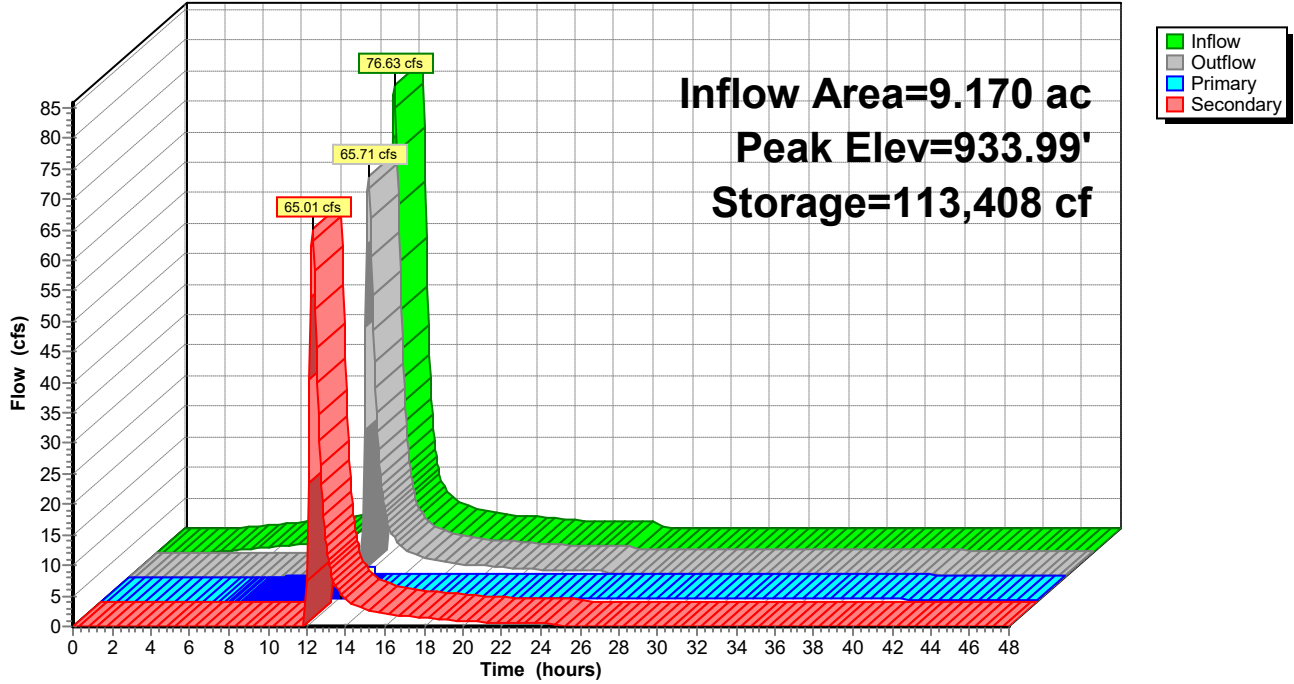
Type II 24-hr 100-YR Rainfall=10.80"

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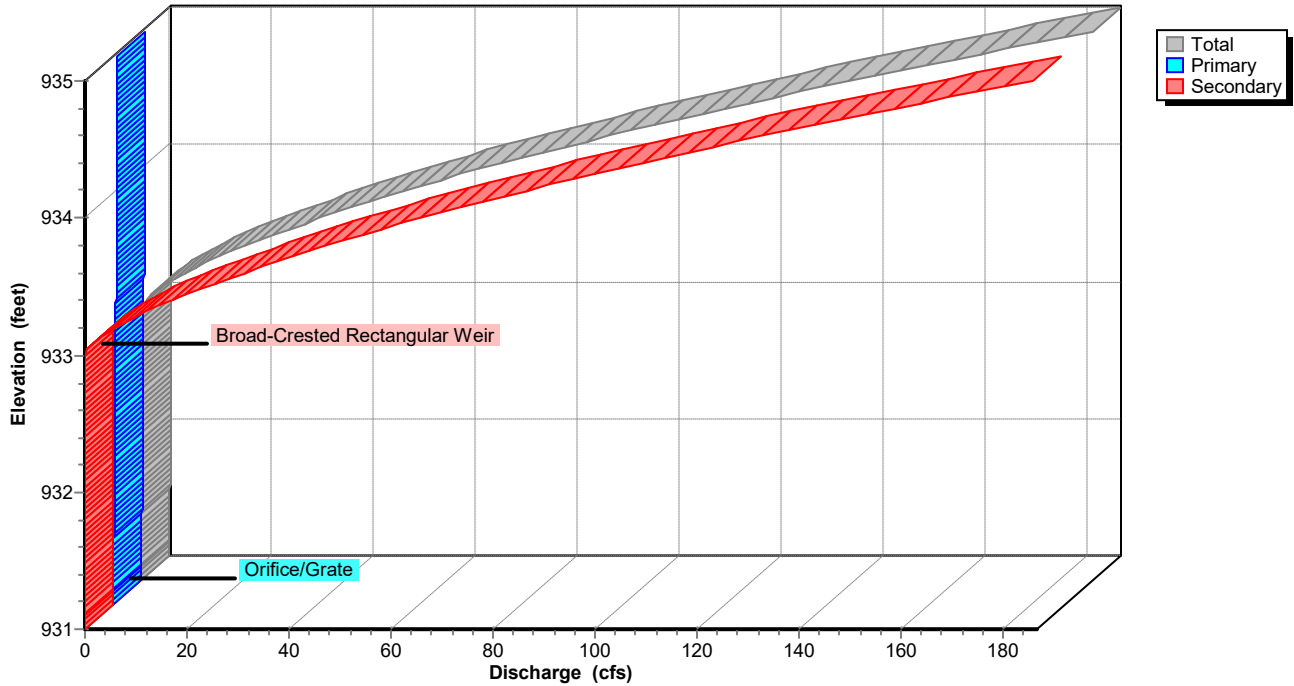
Pond 1P: Pond 1

Hydrograph



Pond 1P: Pond 1

Stage-Discharge



10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

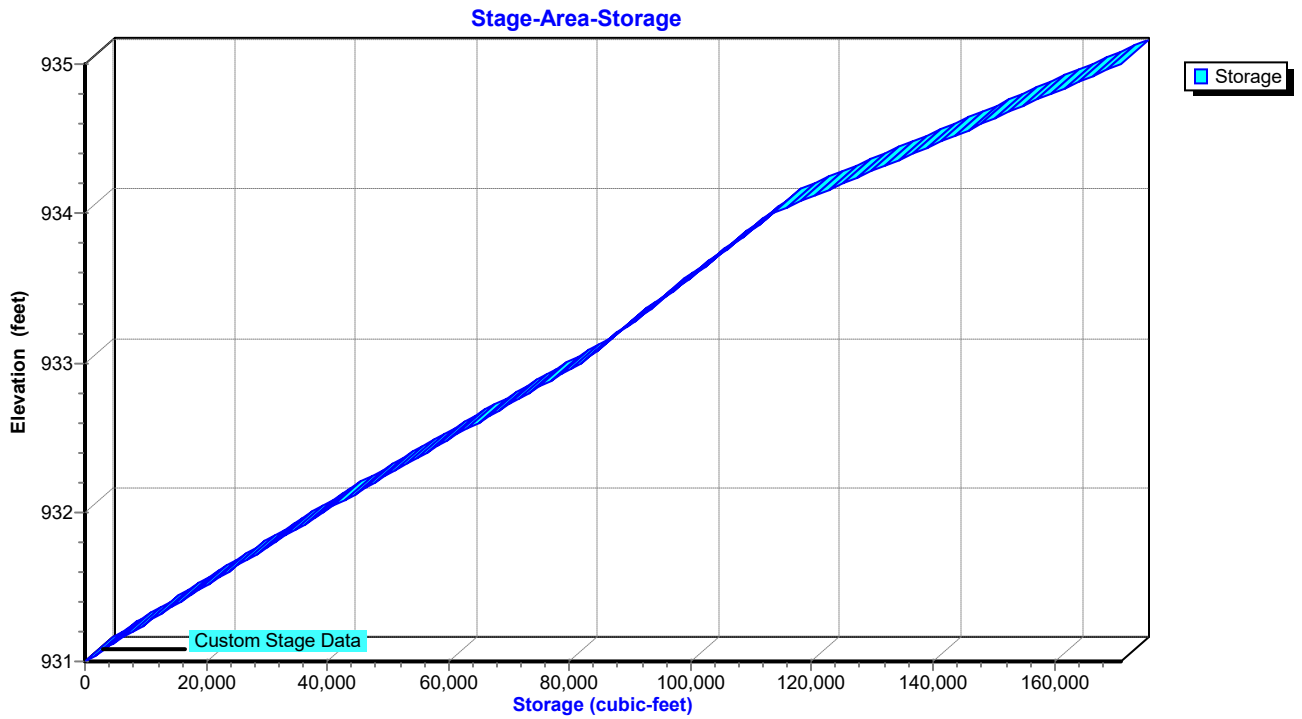
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Pond 1P: Pond 1



10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Hydrograph for Pond 1P: Pond 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	931.00	0.00	0.00	0.00
1.00	0.00	0	931.00	0.00	0.00	0.00
2.00	0.00	0	931.00	0.00	0.00	0.00
3.00	0.19	261	931.01	0.00	0.00	0.00
4.00	0.43	1,384	931.04	0.00	0.00	0.00
5.00	0.68	3,380	931.09	0.00	0.00	0.00
6.00	0.96	6,331	931.16	0.01	0.01	0.00
7.00	1.24	10,188	931.26	0.06	0.06	0.00
8.00	1.52	14,810	931.38	0.14	0.14	0.00
9.00	2.16	20,561	931.52	0.21	0.21	0.00
10.00	2.82	28,689	931.73	0.29	0.29	0.00
11.00	4.93	40,842	932.03	0.37	0.37	0.00
12.00	45.47	80,818	932.98	0.55	0.55	0.00
13.00	9.88	92,522	933.33	13.68	0.60	13.07
14.00	4.49	87,115	933.16	5.07	0.58	4.49
15.00	3.24	85,764	933.12	3.44	0.57	2.87
16.00	2.55	85,080	933.10	2.74	0.57	2.17
17.00	2.13	84,552	933.08	2.21	0.57	1.65
18.00	1.88	84,269	933.08	1.96	0.57	1.40
19.00	1.63	83,956	933.07	1.72	0.56	1.16
20.00	1.39	83,638	933.06	1.47	0.56	0.91
21.00	1.26	83,401	933.05	1.29	0.56	0.73
22.00	1.21	83,318	933.05	1.23	0.56	0.67
23.00	1.16	83,253	933.04	1.18	0.56	0.62
24.00	1.11	83,190	933.04	1.13	0.56	0.57
25.00	0.02	81,655	932.99	0.55	0.55	0.00
26.00	0.00	79,688	932.95	0.54	0.54	0.00
27.00	0.00	77,740	932.90	0.54	0.54	0.00
28.00	0.00	75,819	932.86	0.53	0.53	0.00
29.00	0.00	73,925	932.81	0.52	0.52	0.00
30.00	0.00	72,057	932.77	0.51	0.51	0.00
31.00	0.00	70,217	932.73	0.51	0.51	0.00
32.00	0.00	68,403	932.68	0.50	0.50	0.00
33.00	0.00	66,617	932.64	0.49	0.49	0.00
34.00	0.00	64,857	932.60	0.49	0.49	0.00
35.00	0.00	63,124	932.56	0.48	0.48	0.00
36.00	0.00	61,419	932.52	0.47	0.47	0.00
37.00	0.00	59,740	932.48	0.46	0.46	0.00
38.00	0.00	58,088	932.44	0.46	0.46	0.00
39.00	0.00	56,463	932.40	0.45	0.45	0.00
40.00	0.00	54,865	932.36	0.44	0.44	0.00
41.00	0.00	53,294	932.33	0.43	0.43	0.00
42.00	0.00	51,750	932.29	0.43	0.43	0.00
43.00	0.00	50,232	932.25	0.42	0.42	0.00
44.00	0.00	48,742	932.22	0.41	0.41	0.00
45.00	0.00	47,279	932.19	0.40	0.40	0.00
46.00	0.00	45,842	932.15	0.40	0.40	0.00
47.00	0.00	44,433	932.12	0.39	0.39	0.00
48.00	0.00	43,050	932.09	0.38	0.38	0.00

10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Stage-Discharge for Pond 1P: Pond 1

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
931.00	0.00	0.00	0.00	933.60	32.01	0.64	31.37
931.05	0.00	0.00	0.00	933.65	35.83	0.65	35.18
931.10	0.00	0.00	0.00	933.70	39.75	0.66	39.09
931.15	0.01	0.01	0.00	933.75	43.77	0.66	43.11
931.20	0.02	0.02	0.00	933.80	47.89	0.67	47.23
931.25	0.05	0.05	0.00	933.85	52.35	0.68	51.67
931.30	0.08	0.08	0.00	933.90	56.93	0.68	56.25
931.35	0.12	0.12	0.00	933.95	61.63	0.69	60.94
931.40	0.15	0.15	0.00	934.00	66.44	0.69	65.75
931.45	0.18	0.18	0.00	934.05	71.51	0.70	70.81
931.50	0.20	0.20	0.00	934.10	76.71	0.71	76.00
931.55	0.22	0.22	0.00	934.15	82.03	0.71	81.32
931.60	0.24	0.24	0.00	934.20	87.48	0.72	86.76
931.65	0.26	0.26	0.00	934.25	92.96	0.73	92.24
931.70	0.28	0.28	0.00	934.30	98.56	0.73	97.83
931.75	0.29	0.29	0.00	934.35	104.26	0.74	103.52
931.80	0.31	0.31	0.00	934.40	110.07	0.74	109.33
931.85	0.32	0.32	0.00	934.45	115.88	0.75	115.13
931.90	0.33	0.33	0.00	934.50	121.78	0.76	121.02
931.95	0.35	0.35	0.00	934.55	127.76	0.76	127.00
932.00	0.36	0.36	0.00	934.60	133.84	0.77	133.07
932.05	0.37	0.37	0.00	934.65	140.13	0.77	139.35
932.10	0.38	0.38	0.00	934.70	146.52	0.78	145.74
932.15	0.39	0.39	0.00	934.75	153.00	0.78	152.21
932.20	0.41	0.41	0.00	934.80	159.57	0.79	158.78
932.25	0.42	0.42	0.00	934.85	166.24	0.80	165.44
932.30	0.43	0.43	0.00	934.90	173.00	0.80	172.20
932.35	0.44	0.44	0.00	934.95	179.85	0.81	179.04
932.40	0.45	0.45	0.00	935.00	186.78	0.81	185.97
932.45	0.46	0.46	0.00				
932.50	0.47	0.47	0.00				
932.55	0.48	0.48	0.00				
932.60	0.49	0.49	0.00				
932.65	0.49	0.49	0.00				
932.70	0.50	0.50	0.00				
932.75	0.51	0.51	0.00				
932.80	0.52	0.52	0.00				
932.85	0.53	0.53	0.00				
932.90	0.54	0.54	0.00				
932.95	0.55	0.55	0.00				
933.00	0.55	0.55	0.00				
933.05	1.31	0.56	0.75				
933.10	2.69	0.57	2.12				
933.15	4.47	0.58	3.89				
933.20	6.58	0.58	5.99				
933.25	8.98	0.59	8.39				
933.30	11.65	0.60	11.05				
933.35	14.56	0.61	13.95				
933.40	17.69	0.61	17.08				
933.45	21.00	0.62	20.38				
933.50	24.49	0.63	23.86				
933.55	28.17	0.63	27.53				

10500.039-Pond Calcs

Type II 24-hr 100-YR Rainfall=10.80"

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Stage-Area-Storage for Pond 1P: Pond 1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
931.00	0	933.60	100,942
931.05	1,970	933.65	102,531
931.10	3,940	933.70	104,119
931.15	5,910	933.75	105,708
931.20	7,880	933.80	107,297
931.25	9,851	933.85	108,885
931.30	11,821	933.90	110,474
931.35	13,791	933.95	112,062
931.40	15,761	934.00	113,651
931.45	17,731	934.05	116,520
931.50	19,701	934.10	119,388
931.55	21,671	934.15	122,257
931.60	23,641	934.20	125,126
931.65	25,611	934.25	127,994
931.70	27,581	934.30	130,863
931.75	29,552	934.35	133,732
931.80	31,522	934.40	136,600
931.85	33,492	934.45	139,469
931.90	35,462	934.50	142,338
931.95	37,432	934.55	145,206
932.00	39,402	934.60	148,075
932.05	41,526	934.65	150,943
932.10	43,650	934.70	153,812
932.15	45,774	934.75	156,681
932.20	47,897	934.80	159,549
932.25	50,021	934.85	162,418
932.30	52,145	934.90	165,287
932.35	54,269	934.95	168,155
932.40	56,393	935.00	171,024
932.45	58,517		
932.50	60,641		
932.55	62,764		
932.60	64,888		
932.65	67,012		
932.70	69,136		
932.75	71,260		
932.80	73,384		
932.85	75,507		
932.90	77,631		
932.95	79,755		
933.00	81,879		
933.05	83,468		
933.10	85,056		
933.15	86,645		
933.20	88,233		
933.25	89,822		
933.30	91,411		
933.35	92,999		
933.40	94,588		
933.45	96,176		
933.50	97,765		
933.55	99,354		

10500.039-Pond Calcs

Constant Intensity 1.00 hrs WQV Rainfall=1.38"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: Development Area Runoff Area=9.170 ac 41.44% Impervious Runoff Depth=0.59"
Flow Length=650' Tc=26.5 min CN=90 Runoff=7.77 cfs 0.451 af

Reach 2R: Grassy Swale Avg. Flow Depth=0.07' Max Vel=0.48 fps Inflow=0.20 cfs 0.283 af
n=0.040 L=150.0' S=0.0067 '/' Capacity=86.13 cfs Outflow=0.20 cfs 0.283 af

Pond 1P: Pond 1 Peak Elev=931.48' Storage=19,044 cf Inflow=7.77 cfs 0.451 af
Primary=0.20 cfs 0.283 af Secondary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.283 af

Total Runoff Area = 9.170 ac Runoff Volume = 0.451 af Average Runoff Depth = 0.59"
58.56% Pervious = 5.370 ac 41.44% Impervious = 3.800 ac

10500.039-Pond Calcs

Constant Intensity 1.00 hrs WQV Rainfall=1.38"

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Summary for Subcatchment 2S: Development Area

Runoff = 7.77 cfs @ 1.14 hrs, Volume= 0.451 af, Depth= 0.59"

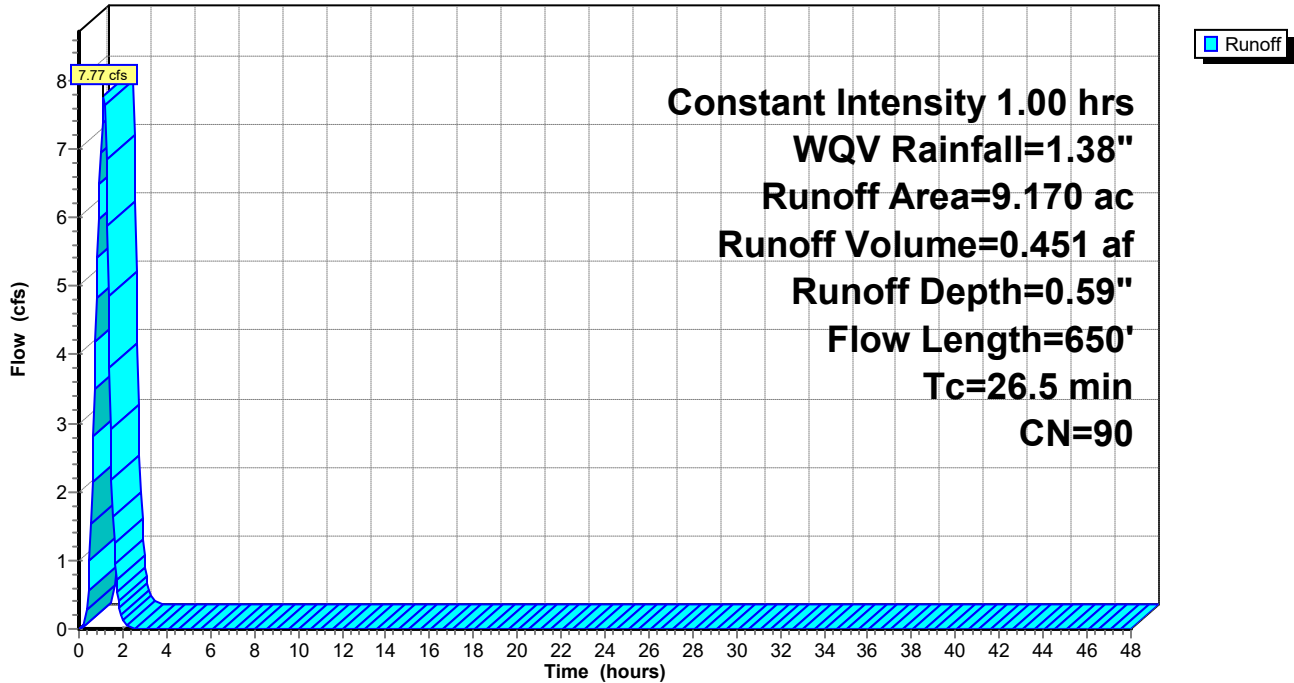
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Constant Intensity 1.00 hrs WQV Rainfall=1.38"

Area (ac)	CN	Description
* 3.800	98	Paved parking,
5.370	84	50-75% Grass cover, Fair, HSG D
9.170	90	Weighted Average
5.370		58.56% Pervious Area
3.800		41.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0050	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.88"
10.1	300	0.0050	0.49		Shallow Concentrated Flow, SHALLOW Short Grass Pasture Kv= 7.0 fps
0.9	250	0.0500	4.54		Shallow Concentrated Flow, SHALLOW-PAVED Paved Kv= 20.3 fps
26.5	650	Total			

Subcatchment 2S: Development Area

Hydrograph



10500.039-Pond Calcs

Constant Intensity 1.00 hrs WQV Rainfall=1.38"

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Hydrograph for Subcatchment 2S: Development Area

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.00	1.38	0.59	0.00
0.50	0.69	0.14	0.99	26.50	1.38	0.59	0.00
1.00	1.38	0.59	6.96	27.00	1.38	0.59	0.00
1.50	1.38	0.59	2.18	27.50	1.38	0.59	0.00
2.00	1.38	0.59	0.13	28.00	1.38	0.59	0.00
2.50	1.38	0.59	0.00	28.50	1.38	0.59	0.00
3.00	1.38	0.59	0.00	29.00	1.38	0.59	0.00
3.50	1.38	0.59	0.00	29.50	1.38	0.59	0.00
4.00	1.38	0.59	0.00	30.00	1.38	0.59	0.00
4.50	1.38	0.59	0.00	30.50	1.38	0.59	0.00
5.00	1.38	0.59	0.00	31.00	1.38	0.59	0.00
5.50	1.38	0.59	0.00	31.50	1.38	0.59	0.00
6.00	1.38	0.59	0.00	32.00	1.38	0.59	0.00
6.50	1.38	0.59	0.00	32.50	1.38	0.59	0.00
7.00	1.38	0.59	0.00	33.00	1.38	0.59	0.00
7.50	1.38	0.59	0.00	33.50	1.38	0.59	0.00
8.00	1.38	0.59	0.00	34.00	1.38	0.59	0.00
8.50	1.38	0.59	0.00	34.50	1.38	0.59	0.00
9.00	1.38	0.59	0.00	35.00	1.38	0.59	0.00
9.50	1.38	0.59	0.00	35.50	1.38	0.59	0.00
10.00	1.38	0.59	0.00	36.00	1.38	0.59	0.00
10.50	1.38	0.59	0.00	36.50	1.38	0.59	0.00
11.00	1.38	0.59	0.00	37.00	1.38	0.59	0.00
11.50	1.38	0.59	0.00	37.50	1.38	0.59	0.00
12.00	1.38	0.59	0.00	38.00	1.38	0.59	0.00
12.50	1.38	0.59	0.00	38.50	1.38	0.59	0.00
13.00	1.38	0.59	0.00	39.00	1.38	0.59	0.00
13.50	1.38	0.59	0.00	39.50	1.38	0.59	0.00
14.00	1.38	0.59	0.00	40.00	1.38	0.59	0.00
14.50	1.38	0.59	0.00	40.50	1.38	0.59	0.00
15.00	1.38	0.59	0.00	41.00	1.38	0.59	0.00
15.50	1.38	0.59	0.00	41.50	1.38	0.59	0.00
16.00	1.38	0.59	0.00	42.00	1.38	0.59	0.00
16.50	1.38	0.59	0.00	42.50	1.38	0.59	0.00
17.00	1.38	0.59	0.00	43.00	1.38	0.59	0.00
17.50	1.38	0.59	0.00	43.50	1.38	0.59	0.00
18.00	1.38	0.59	0.00	44.00	1.38	0.59	0.00
18.50	1.38	0.59	0.00	44.50	1.38	0.59	0.00
19.00	1.38	0.59	0.00	45.00	1.38	0.59	0.00
19.50	1.38	0.59	0.00	45.50	1.38	0.59	0.00
20.00	1.38	0.59	0.00	46.00	1.38	0.59	0.00
20.50	1.38	0.59	0.00	46.50	1.38	0.59	0.00
21.00	1.38	0.59	0.00	47.00	1.38	0.59	0.00
21.50	1.38	0.59	0.00	47.50	1.38	0.59	0.00
22.00	1.38	0.59	0.00	48.00	1.38	0.59	0.00
22.50	1.38	0.59	0.00				
23.00	1.38	0.59	0.00				
23.50	1.38	0.59	0.00				
24.00	1.38	0.59	0.00				
24.50	1.38	0.59	0.00				
25.00	1.38	0.59	0.00				
25.50	1.38	0.59	0.00				

Summary for Reach 2R: Grassy Swale

Inflow Area = 9.170 ac, 41.44% Impervious, Inflow Depth > 0.37" for WQV event
 Inflow = 0.20 cfs @ 1.93 hrs, Volume= 0.283 af
 Outflow = 0.20 cfs @ 2.08 hrs, Volume= 0.283 af, Atten= 0%, Lag= 8.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.48 fps, Min. Travel Time= 5.2 min
 Avg. Velocity = 0.32 fps, Avg. Travel Time= 7.9 min

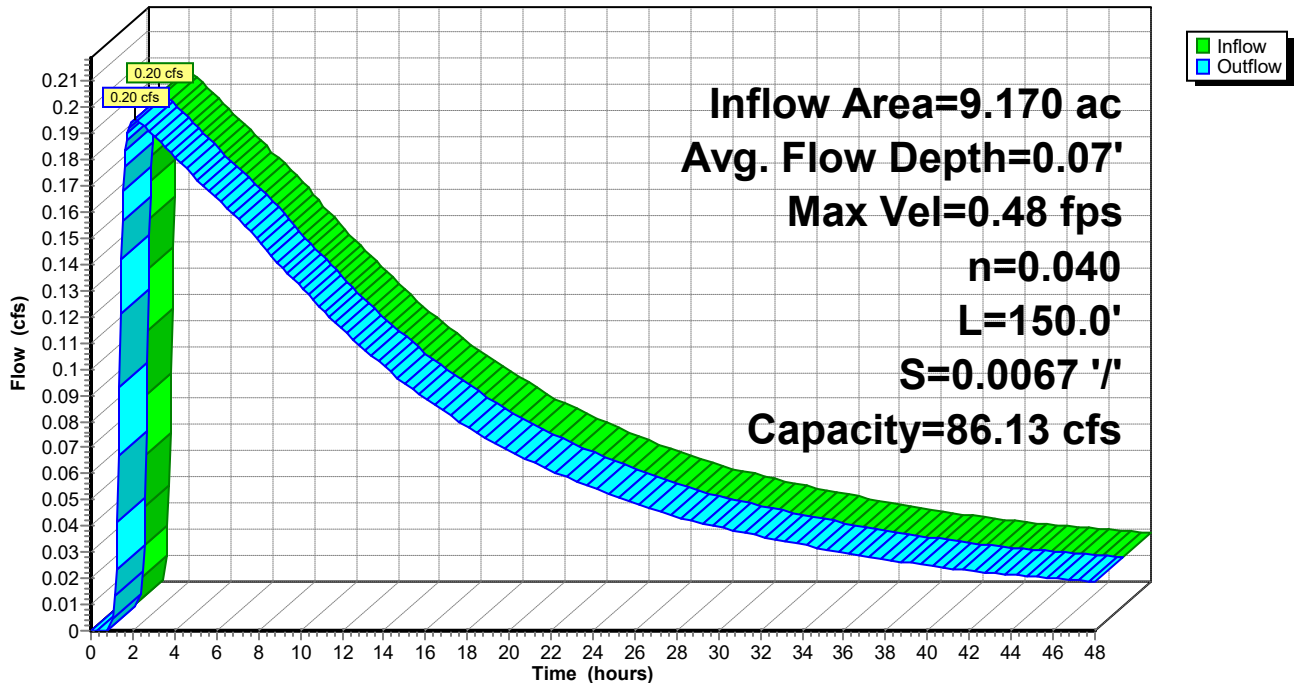
Peak Storage= 61 cf @ 2.00 hrs
 Average Depth at Peak Storage= 0.07'
 Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 86.13 cfs

6.00' x 2.00' deep channel, n= 0.040
 Side Slope Z-value= 3.0 '/' Top Width= 18.00'
 Length= 150.0' Slope= 0.0067 '/'
 Inlet Invert= 280.00', Outlet Invert= 279.00'

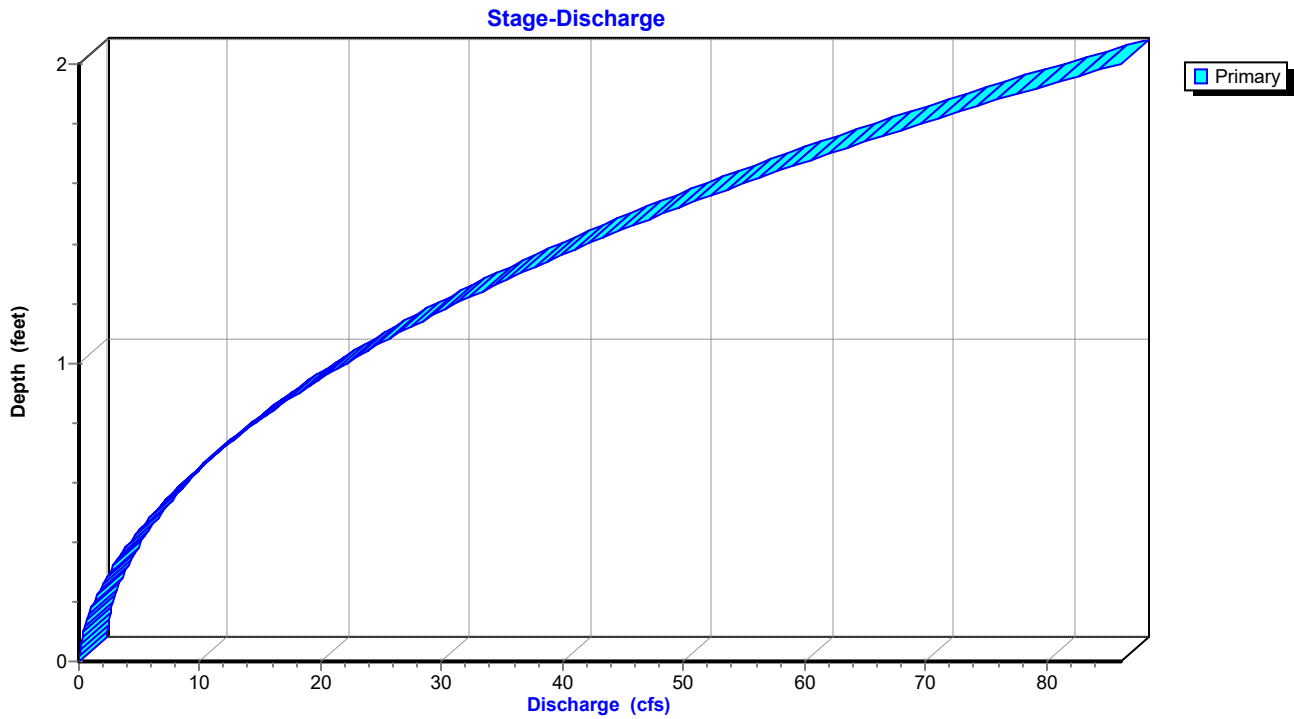


Reach 2R: Grassy Swale

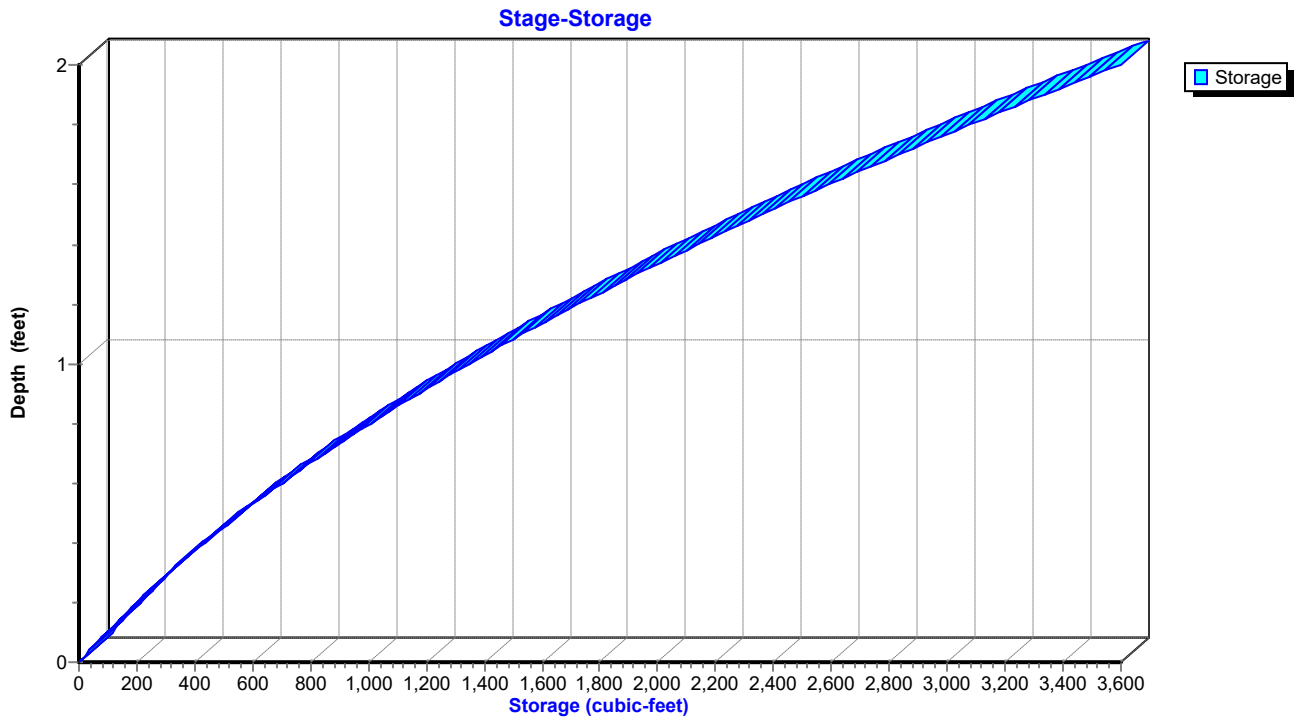
Hydrograph



Reach 2R: Grassy Swale



Reach 2R: Grassy Swale



10500.039-Pond Calcs

Constant Intensity 1.00 hrs WQV Rainfall=1.38"

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Hydrograph for Reach 2R: Grassy Swale

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.00	0	280.00	0.00
1.00	0.02	3	280.00	0.00
2.00	0.20	61	280.07	0.20
3.00	0.19	59	280.06	0.19
4.00	0.18	58	280.06	0.18
5.00	0.17	56	280.06	0.17
6.00	0.16	55	280.06	0.17
7.00	0.16	53	280.06	0.16
8.00	0.15	51	280.06	0.15
9.00	0.14	49	280.05	0.14
10.00	0.13	47	280.05	0.13
11.00	0.12	45	280.05	0.12
12.00	0.11	43	280.05	0.12
13.00	0.11	42	280.05	0.11
14.00	0.10	40	280.04	0.10
15.00	0.09	39	280.04	0.09
16.00	0.09	37	280.04	0.09
17.00	0.08	36	280.04	0.08
18.00	0.08	34	280.04	0.08
19.00	0.07	33	280.04	0.07
20.00	0.07	31	280.03	0.07
21.00	0.06	30	280.03	0.06
22.00	0.06	29	280.03	0.06
23.00	0.06	28	280.03	0.06
24.00	0.05	27	280.03	0.05
25.00	0.05	26	280.03	0.05
26.00	0.05	25	280.03	0.05
27.00	0.05	24	280.03	0.05
28.00	0.04	23	280.03	0.04
29.00	0.04	23	280.02	0.04
30.00	0.04	22	280.02	0.04
31.00	0.04	22	280.02	0.04
32.00	0.04	21	280.02	0.04
33.00	0.03	21	280.02	0.03
34.00	0.03	20	280.02	0.03
35.00	0.03	20	280.02	0.03
36.00	0.03	19	280.02	0.03
37.00	0.03	19	280.02	0.03
38.00	0.03	18	280.02	0.03
39.00	0.03	18	280.02	0.03
40.00	0.02	17	280.02	0.02
41.00	0.02	16	280.02	0.02
42.00	0.02	15	280.02	0.02
43.00	0.02	15	280.02	0.02
44.00	0.02	14	280.02	0.02
45.00	0.02	14	280.02	0.02
46.00	0.02	14	280.01	0.02
47.00	0.02	13	280.01	0.02
48.00	0.02	13	280.01	0.02

10500.039-Pond Calcs

Constant Intensity 1.00 hrs WQV Rainfall=1.38"

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Stage-Discharge for Reach 2R: Grassy Swale

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
280.00	0.00	0.00	281.04	2.51	23.84
280.02	0.22	0.03	281.06	2.54	24.71
280.04	0.35	0.09	281.08	2.57	25.60
280.06	0.46	0.17	281.10	2.59	26.51
280.08	0.55	0.27	281.12	2.62	27.43
280.10	0.63	0.40	281.14	2.64	28.37
280.12	0.71	0.54	281.16	2.67	29.33
280.14	0.78	0.70	281.18	2.69	30.31
280.16	0.85	0.88	281.20	2.72	31.30
280.18	0.91	1.07	281.22	2.74	32.31
280.20	0.97	1.28	281.24	2.77	33.34
280.22	1.03	1.51	281.26	2.79	34.38
280.24	1.09	1.75	281.28	2.81	35.44
280.26	1.14	2.01	281.30	2.84	36.52
280.28	1.19	2.28	281.32	2.86	37.62
280.30	1.24	2.57	281.34	2.89	38.74
280.32	1.29	2.87	281.36	2.91	39.87
280.34	1.34	3.19	281.38	2.93	41.02
280.36	1.38	3.53	281.40	2.95	42.19
280.38	1.43	3.87	281.42	2.98	43.38
280.40	1.47	4.24	281.44	3.00	44.59
280.42	1.51	4.61	281.46	3.02	45.81
280.44	1.55	5.01	281.48	3.05	47.05
280.46	1.59	5.41	281.50	3.07	48.31
280.48	1.63	5.83	281.52	3.09	49.59
280.50	1.67	6.27	281.54	3.11	50.89
280.52	1.71	6.72	281.56	3.13	52.21
280.54	1.75	7.19	281.58	3.16	53.55
280.56	1.78	7.67	281.60	3.18	54.90
280.58	1.82	8.17	281.62	3.20	56.28
280.60	1.85	8.68	281.64	3.22	57.67
280.62	1.89	9.20	281.66	3.24	59.08
280.64	1.92	9.74	281.68	3.26	60.52
280.66	1.96	10.30	281.70	3.28	61.97
280.68	1.99	10.87	281.72	3.30	63.44
280.70	2.02	11.46	281.74	3.33	64.93
280.72	2.05	12.06	281.76	3.35	66.44
280.74	2.08	12.68	281.78	3.37	67.97
280.76	2.12	13.31	281.80	3.39	69.52
280.78	2.15	13.96	281.82	3.41	71.09
280.80	2.18	14.62	281.84	3.43	72.68
280.82	2.21	15.30	281.86	3.45	74.29
280.84	2.24	16.00	281.88	3.47	75.92
280.86	2.26	16.71	281.90	3.49	77.57
280.88	2.29	17.44	281.92	3.51	79.24
280.90	2.32	18.18	281.94	3.53	80.93
280.92	2.35	18.94	281.96	3.55	82.64
280.94	2.38	19.71	281.98	3.57	84.38
280.96	2.41	20.51	282.00	3.59	86.13
280.98	2.43	21.31			
281.00	2.46	22.14			
281.02	2.49	22.98			

10500.039-Pond Calcs

Constant Intensity 1.00 hrs WQV Rainfall=1.38"

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Stage-Area-Storage for Reach 2R: Grassy Swale

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
280.00	0.0	0	281.04	9.5	1,423
280.02	0.1	18	281.06	9.7	1,460
280.04	0.2	37	281.08	10.0	1,497
280.06	0.4	56	281.10	10.2	1,535
280.08	0.5	75	281.12	10.5	1,572
280.10	0.6	95	281.14	10.7	1,611
280.12	0.8	114	281.16	11.0	1,650
280.14	0.9	135	281.18	11.3	1,689
280.16	1.0	156	281.20	11.5	1,728
280.18	1.2	177	281.22	11.8	1,768
280.20	1.3	198	281.24	12.1	1,808
280.22	1.5	220	281.26	12.3	1,848
280.24	1.6	242	281.28	12.6	1,889
280.26	1.8	264	281.30	12.9	1,931
280.28	1.9	287	281.32	13.1	1,972
280.30	2.1	311	281.34	13.4	2,014
280.32	2.2	334	281.36	13.7	2,056
280.34	2.4	358	281.38	14.0	2,099
280.36	2.5	382	281.40	14.3	2,142
280.38	2.7	407	281.42	14.6	2,185
280.40	2.9	432	281.44	14.9	2,229
280.42	3.0	457	281.46	15.2	2,273
280.44	3.2	483	281.48	15.5	2,318
280.46	3.4	509	281.50	15.8	2,363
280.48	3.6	536	281.52	16.1	2,408
280.50	3.8	563	281.54	16.4	2,453
280.52	3.9	590	281.56	16.7	2,499
280.54	4.1	617	281.58	17.0	2,545
280.56	4.3	645	281.60	17.3	2,592
280.58	4.5	673	281.62	17.6	2,639
280.60	4.7	702	281.64	17.9	2,686
280.62	4.9	731	281.66	18.2	2,734
280.64	5.1	760	281.68	18.5	2,782
280.66	5.3	790	281.70	18.9	2,830
280.68	5.5	820	281.72	19.2	2,879
280.70	5.7	851	281.74	19.5	2,928
280.72	5.9	881	281.76	19.9	2,978
280.74	6.1	912	281.78	20.2	3,028
280.76	6.3	944	281.80	20.5	3,078
280.78	6.5	976	281.82	20.9	3,129
280.80	6.7	1,008	281.84	21.2	3,180
280.82	6.9	1,041	281.86	21.5	3,231
280.84	7.2	1,074	281.88	21.9	3,282
280.86	7.4	1,107	281.90	22.2	3,335
280.88	7.6	1,140	281.92	22.6	3,387
280.90	7.8	1,175	281.94	22.9	3,440
280.92	8.1	1,209	281.96	23.3	3,493
280.94	8.3	1,244	281.98	23.6	3,546
280.96	8.5	1,279	282.00	24.0	3,600
280.98	8.8	1,314			
281.00	9.0	1,350			
281.02	9.2	1,386			

10500.039-Pond Calcs

Constant Intensity 1.00 hrs WQV Rainfall=1.38"

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Summary for Pond 1P: Pond 1

Inflow Area = 9.170 ac, 41.44% Impervious, Inflow Depth = 0.59" for WQV event
 Inflow = 7.77 cfs @ 1.14 hrs, Volume= 0.451 af
 Outflow = 0.20 cfs @ 1.93 hrs, Volume= 0.283 af, Atten= 97%, Lag= 47.9 min
 Primary = 0.20 cfs @ 1.93 hrs, Volume= 0.283 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 931.48' @ 1.93 hrs Surf.Area= 0 sf Storage= 19,044 cf

Plug-Flow detention time= 865.9 min calculated for 0.283 af (63% of inflow)
 Center-of-Mass det. time= 857.5 min (922.6 - 65.0)

Volume	Invert	Avail.Storage	Storage Description
#1	931.00'	171,024 cf	Custom Stage Data Listed below

Elevation (feet)	Cum.Store (cubic-feet)
931.00	0
932.00	39,402
933.00	81,879
934.00	113,651
935.00	171,024

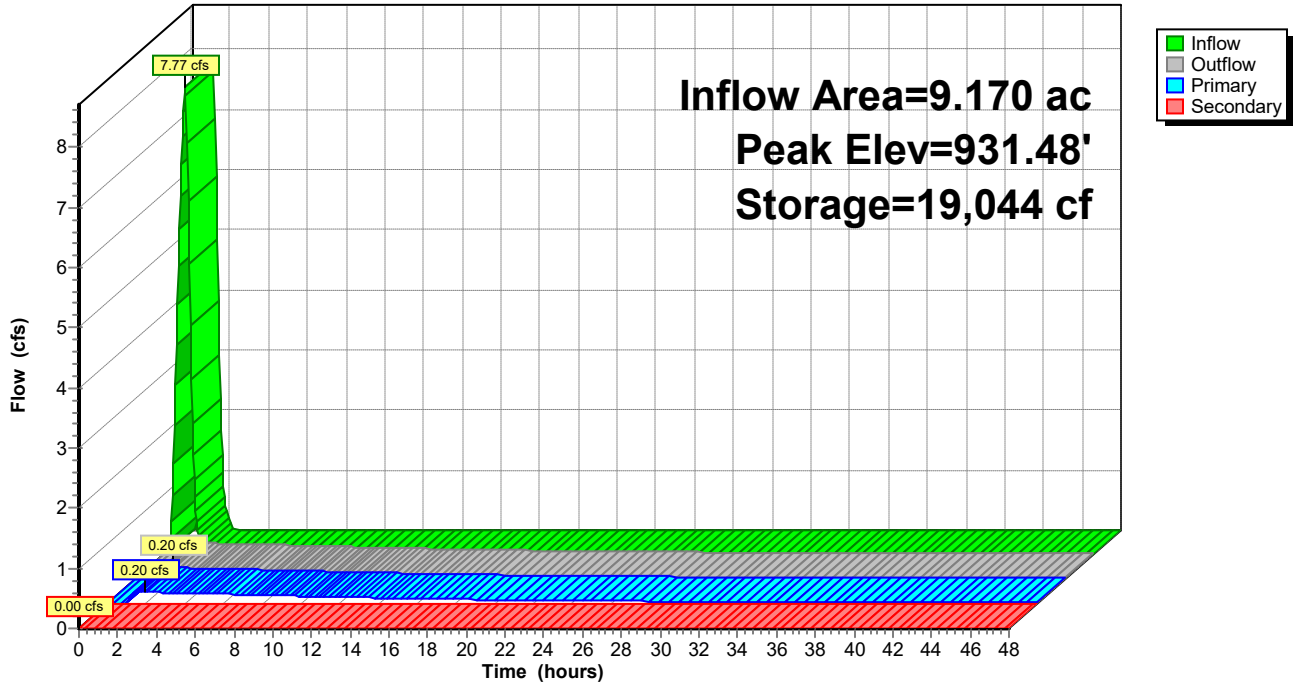
Device	Routing	Invert	Outlet Devices
#1	Primary	931.10'	4.0" Vert. Orifice/Grate C= 0.600
#2	Secondary	933.00'	25.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.20 cfs @ 1.93 hrs HW=931.48' (Free Discharge)
 ↑1=**Orifice/Grate** (Orifice Controls 0.20 cfs @ 2.24 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=931.00' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

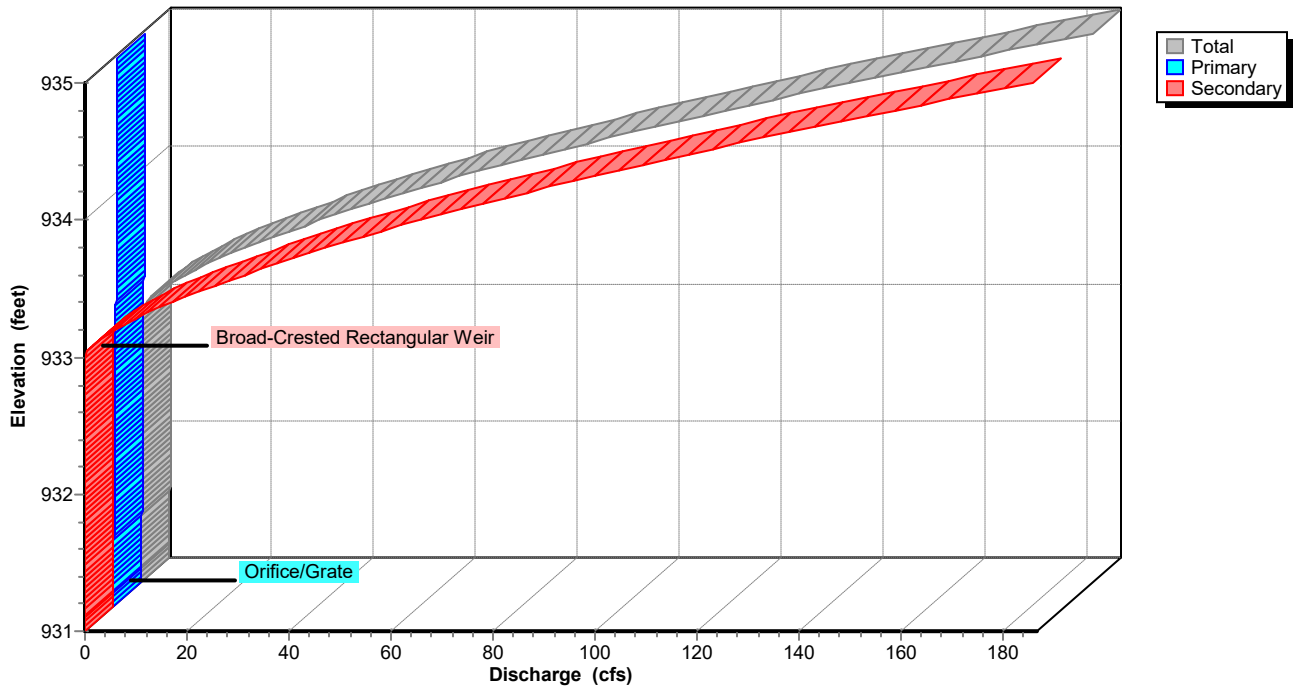
Pond 1P: Pond 1

Hydrograph

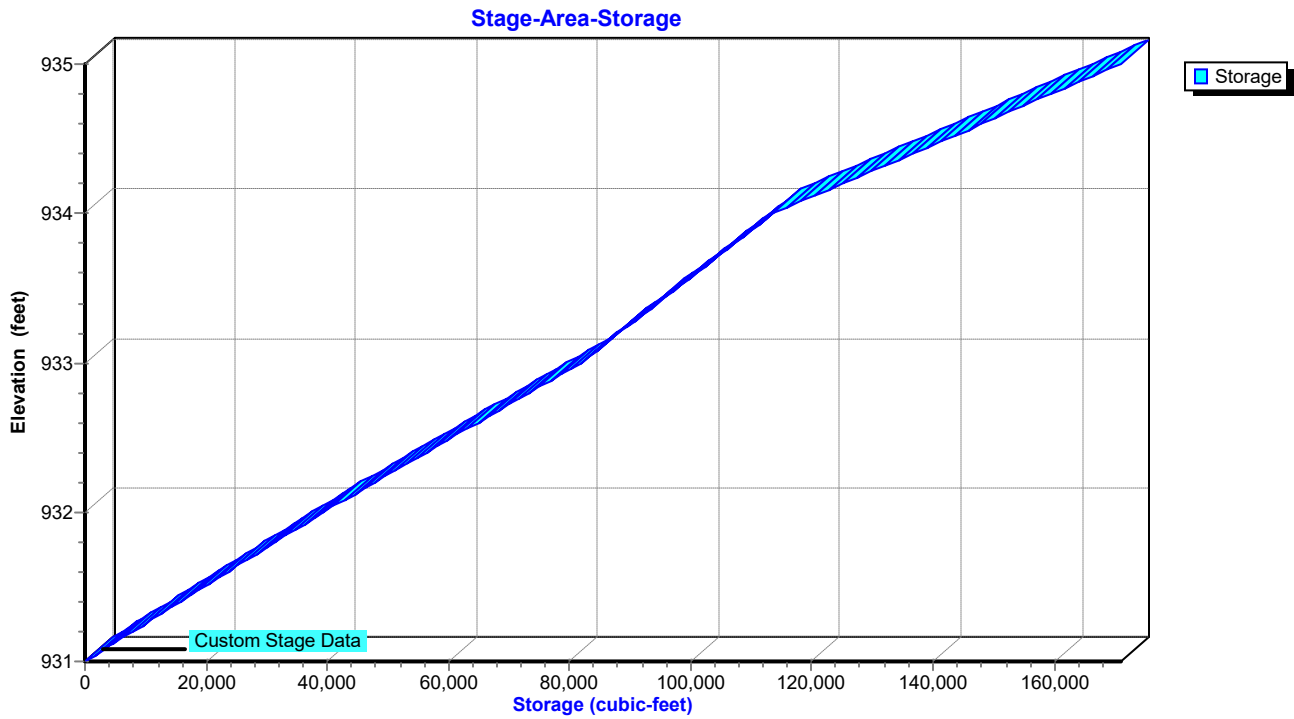


Pond 1P: Pond 1

Stage-Discharge



Pond 1P: Pond 1



10500.039-Pond Calcs

Constant Intensity 1.00 hrs WQV Rainfall=1.38"

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Hydrograph for Pond 1P: Pond 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	931.00	0.00	0.00	0.00
1.00	6.96	7,609	931.19	0.02	0.02	0.00
2.00	0.13	19,036	931.48	0.20	0.20	0.00
3.00	0.00	18,413	931.47	0.19	0.19	0.00
4.00	0.00	17,751	931.45	0.18	0.18	0.00
5.00	0.00	17,117	931.43	0.17	0.17	0.00
6.00	0.00	16,512	931.42	0.16	0.16	0.00
7.00	0.00	15,935	931.40	0.16	0.16	0.00
8.00	0.00	15,386	931.39	0.15	0.15	0.00
9.00	0.00	14,871	931.38	0.14	0.14	0.00
10.00	0.00	14,387	931.37	0.13	0.13	0.00
11.00	0.00	13,932	931.35	0.12	0.12	0.00
12.00	0.00	13,507	931.34	0.11	0.11	0.00
13.00	0.00	13,109	931.33	0.11	0.11	0.00
14.00	0.00	12,737	931.32	0.10	0.10	0.00
15.00	0.00	12,389	931.31	0.09	0.09	0.00
16.00	0.00	12,062	931.31	0.09	0.09	0.00
17.00	0.00	11,756	931.30	0.08	0.08	0.00
18.00	0.00	11,469	931.29	0.08	0.08	0.00
19.00	0.00	11,200	931.28	0.07	0.07	0.00
20.00	0.00	10,947	931.28	0.07	0.07	0.00
21.00	0.00	10,709	931.27	0.06	0.06	0.00
22.00	0.00	10,484	931.27	0.06	0.06	0.00
23.00	0.00	10,272	931.26	0.06	0.06	0.00
24.00	0.00	10,071	931.26	0.05	0.05	0.00
25.00	0.00	9,882	931.25	0.05	0.05	0.00
26.00	0.00	9,703	931.25	0.05	0.05	0.00
27.00	0.00	9,534	931.24	0.05	0.05	0.00
28.00	0.00	9,375	931.24	0.04	0.04	0.00
29.00	0.00	9,223	931.23	0.04	0.04	0.00
30.00	0.00	9,078	931.23	0.04	0.04	0.00
31.00	0.00	8,939	931.23	0.04	0.04	0.00
32.00	0.00	8,807	931.22	0.04	0.04	0.00
33.00	0.00	8,681	931.22	0.03	0.03	0.00
34.00	0.00	8,561	931.22	0.03	0.03	0.00
35.00	0.00	8,446	931.21	0.03	0.03	0.00
36.00	0.00	8,337	931.21	0.03	0.03	0.00
37.00	0.00	8,233	931.21	0.03	0.03	0.00
38.00	0.00	8,133	931.21	0.03	0.03	0.00
39.00	0.00	8,038	931.20	0.03	0.03	0.00
40.00	0.00	7,947	931.20	0.02	0.02	0.00
41.00	0.00	7,861	931.20	0.02	0.02	0.00
42.00	0.00	7,778	931.20	0.02	0.02	0.00
43.00	0.00	7,697	931.20	0.02	0.02	0.00
44.00	0.00	7,619	931.19	0.02	0.02	0.00
45.00	0.00	7,544	931.19	0.02	0.02	0.00
46.00	0.00	7,471	931.19	0.02	0.02	0.00
47.00	0.00	7,401	931.19	0.02	0.02	0.00
48.00	0.00	7,333	931.19	0.02	0.02	0.00

10500.039-Pond Calcs

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Stage-Discharge for Pond 1P: Pond 1

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
931.00	0.00	0.00	0.00	933.60	32.01	0.64	31.37
931.05	0.00	0.00	0.00	933.65	35.83	0.65	35.18
931.10	0.00	0.00	0.00	933.70	39.75	0.66	39.09
931.15	0.01	0.01	0.00	933.75	43.77	0.66	43.11
931.20	0.02	0.02	0.00	933.80	47.89	0.67	47.23
931.25	0.05	0.05	0.00	933.85	52.35	0.68	51.67
931.30	0.08	0.08	0.00	933.90	56.93	0.68	56.25
931.35	0.12	0.12	0.00	933.95	61.63	0.69	60.94
931.40	0.15	0.15	0.00	934.00	66.44	0.69	65.75
931.45	0.18	0.18	0.00	934.05	71.51	0.70	70.81
931.50	0.20	0.20	0.00	934.10	76.71	0.71	76.00
931.55	0.22	0.22	0.00	934.15	82.03	0.71	81.32
931.60	0.24	0.24	0.00	934.20	87.48	0.72	86.76
931.65	0.26	0.26	0.00	934.25	92.96	0.73	92.24
931.70	0.28	0.28	0.00	934.30	98.56	0.73	97.83
931.75	0.29	0.29	0.00	934.35	104.26	0.74	103.52
931.80	0.31	0.31	0.00	934.40	110.07	0.74	109.33
931.85	0.32	0.32	0.00	934.45	115.88	0.75	115.13
931.90	0.33	0.33	0.00	934.50	121.78	0.76	121.02
931.95	0.35	0.35	0.00	934.55	127.76	0.76	127.00
932.00	0.36	0.36	0.00	934.60	133.84	0.77	133.07
932.05	0.37	0.37	0.00	934.65	140.13	0.77	139.35
932.10	0.38	0.38	0.00	934.70	146.52	0.78	145.74
932.15	0.39	0.39	0.00	934.75	153.00	0.78	152.21
932.20	0.41	0.41	0.00	934.80	159.57	0.79	158.78
932.25	0.42	0.42	0.00	934.85	166.24	0.80	165.44
932.30	0.43	0.43	0.00	934.90	173.00	0.80	172.20
932.35	0.44	0.44	0.00	934.95	179.85	0.81	179.04
932.40	0.45	0.45	0.00	935.00	186.78	0.81	185.97
932.45	0.46	0.46	0.00				
932.50	0.47	0.47	0.00				
932.55	0.48	0.48	0.00				
932.60	0.49	0.49	0.00				
932.65	0.49	0.49	0.00				
932.70	0.50	0.50	0.00				
932.75	0.51	0.51	0.00				
932.80	0.52	0.52	0.00				
932.85	0.53	0.53	0.00				
932.90	0.54	0.54	0.00				
932.95	0.55	0.55	0.00				
933.00	0.55	0.55	0.00				
933.05	1.31	0.56	0.75				
933.10	2.69	0.57	2.12				
933.15	4.47	0.58	3.89				
933.20	6.58	0.58	5.99				
933.25	8.98	0.59	8.39				
933.30	11.65	0.60	11.05				
933.35	14.56	0.61	13.95				
933.40	17.69	0.61	17.08				
933.45	21.00	0.62	20.38				
933.50	24.49	0.63	23.86				
933.55	28.17	0.63	27.53				

10500.039-Pond Calcs

Constant Intensity 1.00 hrs WQV Rainfall=1.38"

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Stage-Area-Storage for Pond 1P: Pond 1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
931.00	0	933.60	100,942
931.05	1,970	933.65	102,531
931.10	3,940	933.70	104,119
931.15	5,910	933.75	105,708
931.20	7,880	933.80	107,297
931.25	9,851	933.85	108,885
931.30	11,821	933.90	110,474
931.35	13,791	933.95	112,062
931.40	15,761	934.00	113,651
931.45	17,731	934.05	116,520
931.50	19,701	934.10	119,388
931.55	21,671	934.15	122,257
931.60	23,641	934.20	125,126
931.65	25,611	934.25	127,994
931.70	27,581	934.30	130,863
931.75	29,552	934.35	133,732
931.80	31,522	934.40	136,600
931.85	33,492	934.45	139,469
931.90	35,462	934.50	142,338
931.95	37,432	934.55	145,206
932.00	39,402	934.60	148,075
932.05	41,526	934.65	150,943
932.10	43,650	934.70	153,812
932.15	45,774	934.75	156,681
932.20	47,897	934.80	159,549
932.25	50,021	934.85	162,418
932.30	52,145	934.90	165,287
932.35	54,269	934.95	168,155
932.40	56,393	935.00	171,024
932.45	58,517		
932.50	60,641		
932.55	62,764		
932.60	64,888		
932.65	67,012		
932.70	69,136		
932.75	71,260		
932.80	73,384		
932.85	75,507		
932.90	77,631		
932.95	79,755		
933.00	81,879		
933.05	83,468		
933.10	85,056		
933.15	86,645		
933.20	88,233		
933.25	89,822		
933.30	91,411		
933.35	92,999		
933.40	94,588		
933.45	96,176		
933.50	97,765		
933.55	99,354		

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Additional information is provided for cells with a red triangle in the upper right corner
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG
Characters shown in red are data entry fields.

Characters shown in black (Bold) are calculated fields. Changes to these fields will

1. The Required Load Reduction for the total project:

Calculations from RG-348

$$\text{Page 3-29 Equation 3.3: } L_M = 27.2(A_N \times P)$$

where:

$L_{M \text{ TOTAL PROJECT}}$ = Required TSS removal result

A_N = Net increase in impervious area

P = Average annual precipitation

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Williamson	
Total project area included in plan *	9.17	acres
Predevelopment impervious area within the limits of the plan *	0.00	acres
Total post-development impervious area within the limits of the plan *	3.80	acres
Total post-development impervious cover fraction *	0.41	
P =	32	inches

$$L_{M \text{ TOTAL PROJECT}} = \mathbf{3308} \text{ lbs.}$$

* 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. =	1	
Total drainage basin/outfall area =	9.17	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	3.80	acres
Post-development impervious fraction within drainage basin/outfall area =	0.41	
$L_{M \text{ THIS BASIN}}$ =	3308	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Extended Detention**
Removal efficiency = **75** percent
Proposed BMP = **Grassy Swale**

Removal efficiency = **70** percent
 Proposed BMP = **None**
 Removal efficiency = **0** percent

Etot = 83.75

4. Calculate Maximum TSS Load Removed (LR) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_R = (\text{BMP efficiency}) \times P \times (A_I \times C)$

where:

AC = Total On-Site drainage area
 AI = Impervious area proposed in
 AP = Pervious area remaining in th
 LR = TSS Load removed from this

AC = **9.17** acres
 AI = **3.80** acres
 AP = **5.37** acres
 LR = **3601** lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired LM THIS BASIN = **3308** lbs.

F = **0.92**

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.

Rainfall Depth = **2.00** inches
 Post Development Runoff Coefficient = **0.31**
 On-site Water Quality Volume = **20892** cubic feet

Calculations from RG-348

Off-site area draining to BMP = **6.00** acres
 Off-site Impervious cover draining to BMP = **0.00** acres
 Impervious fraction of off-site area = **0.00**
 Off-site Runoff Coefficient = **0.02**

Off-site Water Quality Volume = **871** cubic feet

Storage for Sediment = **4353**

Total Capture Volume (required water quality volume(s) x 1.20) = 26115 cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP
The values for BMP Types not selected in cell C45 will show NA.

7. Retention/Irrigation System

Designed as Required in RG

Required Water Quality Volume for retention basin = **NA** cubic feet

Irrigation Area Calculations:

Soil infiltration/permeability rate = **0.1** in/hr
Irrigation area = **NA** square feet
NA acres

8. Extended Detention Basin System

Designed as Required in RG

Required Water Quality Volume for extended detention basin = **26115** cubic feet

9. Filter area for Sand Filters

Designed as Required in RG

9A. Full Sedimentation and Filtration System

Water Quality Volume for sedimentation basin = **NA** cubic feet

Minimum filter basin area = **NA** square feet

Maximum sedimentation basin area = **NA** square feet

Minimum sedimentation basin area = **NA** square feet

9B. Partial Sedimentation and Filtration System

Water Quality Volume for combined basins = **NA** cubic feet

Minimum filter basin area = **NA** square feet

Maximum sedimentation basin area = **NA** square feet

Minimum sedimentation basin area = **NA** square feet

10. Bioretention System

Designed as Required in RG

Required Water Quality Volume for Bioretention Basin = **NA** cubic feet

11. Wet Basins

Designed as Required in RG

Required capacity of Permanent Pool = **NA** cubic feet

Required capacity at WQV Elevation = **NA** cubic feet

12. Constructed Wetlands

Designed as Required in RG

Required Water Quality Volume for Constructed Wetlands = **NA** cubic feet

13. AquaLogic™ Cartridge System

Designed as Required in RG

**** 2005 Technical Guidance Manual (RG-348) does not exempt the required 20% increase with mainten**

Required Sedimentation chamber capacity = **NA** cubic feet
Filter canisters (FCs) to treat WQV = **NA** cartridges
Filter basin area (RIA_F) = **NA** square feet

14. Stormwater Management StormFilter® by CONTECH

Required Water Quality Volume for Contech StormFilter System = **NA** cubic feet

THE SIZING REQUIREMENTS FOR THE FOLLOWING BMPs / LOAD REMOVALS ARE BASED UPON FL

15. Grassy Swales

Designed as Required in RG

Design parameters for the swale:

Drainage Area to be Treated by the Swale = A = 5.20 acres
Impervious Cover in Drainage Area = 2.08 acres
Rainfall intensity = i = 1.1 in/hr
Swale Slope = 0.007 ft/ft
Side Slope (z) = 3
Design Water Depth = y = 0.33 ft
Weighted Runoff Coefficient = C = 0.49

A_{CS} = cross-sectional area of flow in Swale = 9.51 sf
P_W = Wetted Perimeter = 29.92 feet
R_H = hydraulic radius of flow cross-section = A_{CS}/P_W = 0.32 feet
n = Manning's roughness coefficient = 0.2

15A. Using the Method Described in the RG-348

Manning's Equation: $Q = \frac{1.49}{n} A_{CS} R_H^{2/3} S^{0.5}$

$$b = \frac{0.134 \times Q}{y^{1.67} S^{0.5}} - zy = 27.83 \text{ feet}$$

$$Q = CiA = 2.83 \text{ cfs}$$

To calculate the flow velocity in the swale:

$$V \text{ (Velocity of Flow in the swale)} = Q/A_{CS} = 0.30 \text{ ft/sec}$$

To calculate the resulting swale length:

$$L = \text{Minimum Swale Length} = V \text{ (ft/sec)} * 300 \text{ (sec)} = 89.12 \text{ feet}$$

If any of the resulting values do not meet the design requirement set forth in RG-348, the des

15B. Alternative Method using Excel Solver

$$\text{Design } Q = CiA = 2.83 \text{ cfs}$$

$$\begin{aligned} \text{Manning's Equation } Q &= 0.62 \text{ cfs} \\ \text{Swale Width} &= 6.00 \text{ ft} \end{aligned}$$

Instructions are provided to the right (green comments).

$$\begin{aligned} \text{Flow Velocity} &= 0.30 \text{ ft/s} \\ \text{Minimum Length} &= 89.12 \text{ ft} \end{aligned}$$

Instructions are provided to the right (blue comments).

$$\begin{aligned} \text{Design Width} &= 6 \text{ ft} \\ \text{Design Discharge} &= 0.63 \text{ cfs} \\ \text{Design Depth} &= 0.33 \text{ ft} \\ \text{Flow Velocity} &= 0.27 \text{ cfs} \\ \text{Minimum Length} &= 81.55 \text{ ft} \end{aligned}$$

If any of the resulting values do not meet the design requirement set forth in RG-348, the design paran
If any of the resulting values still do not meet the design requirement set forth in RG-348, widening the

16. Vegetated Filter Strips

Designed as Required in RG

There are no calculations required for determining the load or size of vegetative filter strips.
The 80% removal is provided when the contributing drainage area does not exceed 72 feet (direction c
the sheet flow leaving the impervious cover is directed across 15 feet of engineered filter strips with n
across 50 feet of natural vegetation with a maximum slope of 10%. There can be a break in grade as k

If vegetative filter strips are proposed for an interim permanent BMP, they may be sized as described (

17. Wet Vaults

Designed as Required in RG

Required Load Removal Based upon Equation 3.3 = **NA** lbs

First calculate the load removal at 1.1 in/hour

RG-348 Page 3-30 Equation 3.4: $Q = CiA$

C = runoff coefficient for the drainage area = 0.26
i = design rainfall intensity = 1.1 in/hour
A = drainage area in acres = 5.2 acres

Q = flow rate in cubic feet per second = 1.49 cubic feet/se

RG-348 Page 3-31 Equation 3.5: $V_{OR} = Q/A$

Q = Runoff rate calculated above = 1.49 cubic feet/se
A = Water surface area in the wet vault = 150 square feet

V_{OR} = Overflow Rate = 0.01 feet/sec

Percent TSS Removal from Figure 3-1 (RG-348 Page 3-31) = 53 percent

Load removed by Wet Vault = NA lbs

**If a bypass occurs at a rainfall intensity of less than 1.1 in/hours
Calculate the efficiency reduction for the actual rainfall intensity rate**

Actual Rainfall Intensity at which Wet Vault bypass Occurs = 0.5 in/hour

Fraction of rainfall treated from Figure 3-2 RG-348 Page 3-32 = 0.75 percent
Efficiency Reduction for Actual Rainfall Intensity = 0.83 percent

Resultant TSS Load removed by Wet Vault = NA lbs

18. Permeable Concrete

Designed as Required in RG

PERMEABLE CONCRETE MAY ONLY BE USED ON THE CONTRIBUTING ZONE

19. BMPs Installed in a Series

Designed as Required in RG

Michael E. Barrett, Ph.D.. P.E. recommended that the coefficient for E_2 be changed from

$E_{TOT} = [1 - ((1 - E_1) \times (1 - 0.5E_2) \times (1 - 0.25E_3))] \times 100 = 85.00$ percent

EFFICIENCY OF FIRST BMP IN THE SERIES = $E_1 = 75.00$ percent

EFFICIENCY OF THE SECOND BMP IN THE SERIES = $E_2 = 80.00$ percent

EFFICIENCY OF THE THIRD BMP IN THE SERIES = E_3 = 0.00 percent

THEREFORE, THE NET LOAD REMOVAL WOULD BE:
(A_I AND A_P VALUES ARE FROM SECTION 3 ABOVE)

$$L_R = E_{TOT} \times P \times (A_I \times 34.6 \times A_P \times 0.54) = 3655.13 \text{ lbs}$$

20. Stormceptor

BMP Sizing	Required TSS Removal in BMP Drainage Area=	NA	lbs
	Impervious Cover Overtreatment=	0.0000	ac
	TSS Removal for Uncaptured Area =	0.00	lbs
	Effective Area =	NA	EA
	Calculated Model Size(s) =	#N/A	
	Actual Model Size (if multiple values provided in Calculated Model Size or if you are choosing a larger model size) =	0	Model Size
	Surface Area =	#N/A	ft ²
	Overflow Rate =	#VALUE!	V _{or}
	Rounded Overflow Rate =	#VALUE!	V _{or}
	BMP Efficiency % =	#VALUE!	%
L _R Value =	#VALUE!	lbs	
TSS Load Credit =	#VALUE!	lbs	
Is Sufficient Treatment Available? (TSS Credit ≥ TSS Uncapt.)	#VALUE!		
TSS Treatment by BMP (LM + TSS Uncapt.) =	#VALUE!		

21. Vortech

BMP Sizing	Required TSS Removal in BMP Drainage Area=	NA	lbs
	Impervious Cover Overtreatment=	0.0000	ac
	TSS Removal for Uncaptured Area =	0.00	lbs
	Effective Area =	NA	EA
	Calculated Model Size(s) =	#N/A	
	Actual Model Size (if choosing larger model size) =	Vx1000	Pick Model S
	Surface Area =	7.10	ft ²
	Overflow Rate =	#VALUE!	V _{or}
	Rounded Overflow Rate =	#VALUE!	V _{or}
	BMP Efficiency % =	#VALUE!	%
L _R Value =	#VALUE!	lbs	
TSS Load Credit =	#VALUE!	lbs	
Is Sufficient Treatment Available? (TSS Credit ≥ TSS Uncapt.)	#VALUE!		

TSS Treatment by BMP (LM + TSS Uncapt.) = #VALUE!