

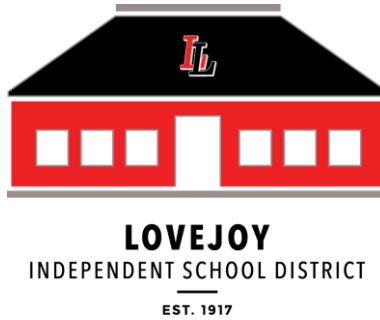
Board Workshop  
Monday, February 7, 2022 5:30 PM

Carrie L. Lovejoy Child Development Center,  
Room D100  
256 Country Club Road  
Allen, TX 75002

## **Agenda**

1. Closed Session, Gov't. Code 551.071-551.084. The Board May Retire into Closed Session in Accordance with the Texas Open Meetings Act  
**Presenter:** Barrett Owens, President
  - 1.A. 551-071 For the purpose of private consultation with the Board's attorney, in person or by phone when the Board seeks the advice of its attorney about: pending or contemplated litigation; a settlement offer; or on a matter in which the duty of the attorney to the governmental body under the Texas Disciplinary Rules of Professional Conduct of the State Bar of Texas clearly conflicts with this chapter.
  - 1.B. 551-072 For the purpose of deliberating the purchase, exchange, lease, or value of real property if deliberation in an open meeting would have a detrimental effect on the position of the District in negotiations with a third person.
  - 1.C. 551-073 For the purpose of deliberating a negotiated contract for a prospective gift donation to the District if deliberation in an open meeting would have a detrimental effect on the Board's position in negotiations with a third person.
  - 1.D. 551-074 For the purpose of deliberating the appointment, employment, evaluation, reassignment, duties, discipline, or dismissal of a public officer or employee or to hear a complaint or charge against an officer or employee. However, the Board may not conduct a closed meeting for these purposes if the officer or employee who is the subject of the deliberation or hearing requests a public hearing.
    - 1.D.1. Evaluation of employees.
  - 1.E. 551-076 For the purpose of deliberating the deployment, or specific occasions for implementation, of security personnel, devices or security audits.
  - 1.F. 551-082 For the purpose of deliberating in a case involving discipline of a public school child, or in which a complaint or charge is brought against a District employee by another employee and the complaint or charge directly results in the need for a hearing. However, the Board may not conduct a closed meeting for this purpose if the employee against whom the complaint or charge is brought makes a written request for an open hearing.
  - 1.G. 551-0821 For the purpose of deliberating a matter regarding a student if personally identifiable information about the student will necessarily be revealed by the deliberation. This exception does not apply if an open meeting about the matter is requested in writing by a parent or guardian of the student or by the student if the student has attained 18 years of age.
  - 1.H. 551-083 For the purpose of discussing or deliberating the standards, guidelines, terms or conditions the Board will follow, or will instruct its representative to follow, in consultation with representatives of employee groups.
  - 1.I. 551-084 For the purpose of excluding a witness from a hearing during the examination of another witness.

2. Return to Open Meeting for Action, If Necessary, On Matters Discussed In Closed Session  
**Presenter:** Barrett Owens, President
3. Opening Exercise  
**Presenter:** Barrett Owens, President
- 3.A. Roll Call  
**Presenter:** Barrett Owens, President
4. Public Comments Related to Agenda Items  
**Presenter:** Kim Steiner, Coordinator of Community Engagement and Organizational Development / Executive Assistant to the Superintendent



# Public Comment Procedures

## Workshops and Special Meetings

### Submitting for Public Comment

Any individual seeking to speak during the public comment session of a workshop or special meeting must complete and submit the public comment card by no later than 15 minutes prior to the designated start time provided on the meeting notice.

Public comment cards must be completed in their entirety with accurate and truthful information and must designate the specific agenda item.

The Board will provide speakers that submit a public comment card on an agenda item the opportunity to speak prior to the Board's consideration of the item in the order in which they were received.

Public comment cards are only applicable to the meeting in which they are completed and submitted by the established deadline.

Each individual gets one opportunity per meeting to share their comments with the Board of Trustees, not multiple opportunities per individual agenda items.

If a speaker is not present when his/her name is called, the speaker forfeits the opportunity to speak at that meeting.

The comments made by speakers at public comment reflect the opinions solely of the speaker and not the Board of Trustees as a governing body or the District.

### Order of Agenda and Limitations

The Board reserves the right to change the order of the agenda items on the notice of meeting and / or defer agenda items until a later date.

Each speaker will be provided up to three minutes to address the Board of Trustees unless more than 10 speakers sign up to speak, in which case, the presiding officer reserves the right to reduce the time allotted to each speaker to no less than one minute per speaker. (Board Policy BED (LOCAL)).

If at any time, in the opinion of the presiding officer, the individual speaker is attempting to address a non-agenda item in the agenda item public comment period, the presiding officer or designee may stop the speaker.

### **Disruptive Behavior**

Disruptive behavior will not be tolerated in the meeting. If after the provision of a single warning, the disruptive behavior continues, the disruptive individual may be escorted out of the meeting by District officials and/or law enforcement.

It is a criminal offense for a person, with intent to prevent or disrupt a lawful meeting, to substantially obstruct or interfere with the ordinary conduct of a meeting by physical action or verbal utterance.

Conduct defined by Texas Penal Code §42.01 and Board Policies BED (LEGAL) and BED (LOCAL).

Failure to yield the podium at the conclusion of the time allotted to a speaker at public comment constitutes a disruption and will be addressed accordingly.

Comments made to the Board of Trustees by meeting attendees and/or speakers outside of the designated public comment periods during a meeting constitute a disruption.

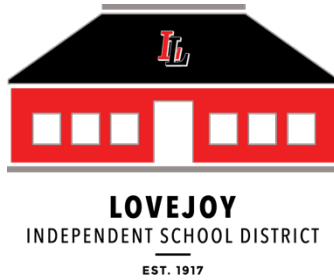
### **Board's Response to Public Comment**

Specific factual information or recitation of existing policy may be furnished in response to inquiries, but the Board shall not deliberate or decide regarding any subject that is not included on the agenda posted with notice of the meeting. The Board may also refer a speaker to a staff member in authority over the issue.

For specific complaints or concerns, speakers are encouraged to utilize the District's appropriate grievance procedures and policies set forth in Board Policies FNG (LOCAL), DGBA (LOCAL), and GF (LOCAL).

### **Statement of Non-Discrimination**

The Board does not discriminate against speech on the basis of viewpoint.



## **School Board Public Comments Sign In February 07, 2022**

The Board of Trustees encourages public comment. All public comment at a meeting other than a regularly scheduled meeting should be limited to agenda items posted for the meeting. By signing up to provide public comment at a Board meeting, you are acknowledging and accepting the procedures for public comment available online at [lovejoyisd.net](http://lovejoyisd.net).

Any individual seeking to speak during the public comment session of a regular board meeting must complete and submit the public comment card by no later than 15 minutes prior to the designated start time provided on the meeting notice. Public comment cards must be completed in their entirety with accurate and truthful information and must designate whether the speaker is speaking on a specific agenda item. Failure to designate an agenda item relevant to the speaker's comments will result in the classification of the public comment as a non-agenda item comment, to be heard at a later time in the meeting. Public comment cards are only applicable to the meeting in which they are completed and submitted by the established deadline.

Each individual will have one opportunity per meeting to share their comments with the Board of Trustees, not multiple opportunities per individual agenda items. If a speaker is not present when his/her name is called, the speaker forfeits the opportunity to speak at that meeting. All speakers will be limited to no more than three minutes. The presiding officer reserves the right to reduce the number of minutes per speaker to no less than one minute per speaker in order to maintain effective meeting management. The speakers will be recognized in the order in which each person signs up. If there are more speakers than time allotted for public comment, the amount of time per speaker may be reduced, as determined appropriate by the Board of Trustees. If time does not allow for you to speak at public comment, the Board of Trustees may allot additional time for public comment or defer specific agenda items for review at a subsequent meeting in an effort to allow more public comment, as determined necessary by the Board. This public comment card will not be maintained from one meeting to the next and is only applicable to the meeting on the date in which it was submitted.

If you have a specific concern related to an employee of the District or a specific student issue, you are encouraged to utilize the District's grievance procedures provided in Board Policies DGBA (LOCAL), FNG (LOCAL), and GF (LOCAL) or applicable grievance process. Each grievance procedure allows for an individual to redress grievances with the Board of Trustees. All relevant policies are available online at [lovejoyisd.net](http://lovejoyisd.net).

Disruptive behavior will not be tolerated in the meeting. If after the provision of a single warning, the disruptive behavior continues, the disruptive individual may be escorted out of the meeting by District officials and/or law enforcement. It is a criminal offense for a person, with intent to prevent or disrupt a lawful meeting, to substantially obstruct or interfere with the ordinary conduct of a meeting by physical action or verbal utterance.

The Board of Trustees appreciates your active participation in the school district.

**\*I wish to address the Board about an item appearing on the February 07, 2022 agenda.**

**I wish to speak about agenda item # \_\_\_\_\_ which is titled:**

---

**First and Last Name:**

---

**Address:**

---

**Phone:**

---

**Organization (if applicable):**

---



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT  
EST. 1917

5. Capacity Assessment Results

**Presenter:** Dr. Jennifer DuPlessis, Assistant Superintendent of Finance and Operations

# 2021 CAPACITY STUDY

February 7, 2022



# SCHOOL CAPACITY – WHAT IS IT & WHY CALCULATE IT?

SCHOOL CAPACITY defines the number of students a school can accommodate.

**Capacity information is used for Planning & Operations, Student Enrollment, and Staffing.**

- *To enroll the right number of students in a school facility*
- *To determine when an expansion / addition to an existing facility is required*
- *To design a new school facility that is right size for its intended enrollment.*



# SCHOOL CAPACITY RE-DEFINED

The number of students that can be reasonably accommodated by a school, building, and site.

## Key Factors and Considerations:

- **Physical Variables**
  - *Building size/area; number/types of teaching stations; support facilities (kitchen, lunchroom, etc.); infrastructure; net to gross ratio; building & life-safety codes; site amenities*
  
- **Operational Variables**
  - *Utilization rates & efficiency; operational policies; staffing; funding structures; teacher/union regulations; space management; staff & operational budgets; special program offerings.*
  
- **Programmatic Variables**
  - *Class size & staff ratios; educational program offerings; operational models (teams, academies, etc.); special programs; schedules; partnerships, off-site learning, etc.*



# SCHOOL CAPACITY RE-DEFINED

## DESIGN CAPACITY

The total number of student “seats” the facility was designed to accommodate.

## FUNCTIONAL CAPACITY

Also considers the desired level of schedule flexibility AND the curriculum and program offerings.



## Methodology / Criteria for Capacity Counts

### Elementary School Classrooms:

Standard – 22 Students / Classroom

Special Education – 12 Students / Classroom

### Capacity Count Not Included:

*Kitchen, Cafeteria, Library, Restrooms, Art, Music, Science, Computer Lab, Gym*

### Intermediate/Middle/High School Classrooms:

Standard – 25 Students / Classroom

Special Education – 12 Students / Classroom

Fine Arts (Small) – 25 Students / Classroom

Fine Arts (Medium) – 40 Students / Classroom

Fine Arts (Large) – 60 Students / Classroom

Gyms – 75 Students / Gym

CTE / Labs – 30 Students / Classroom

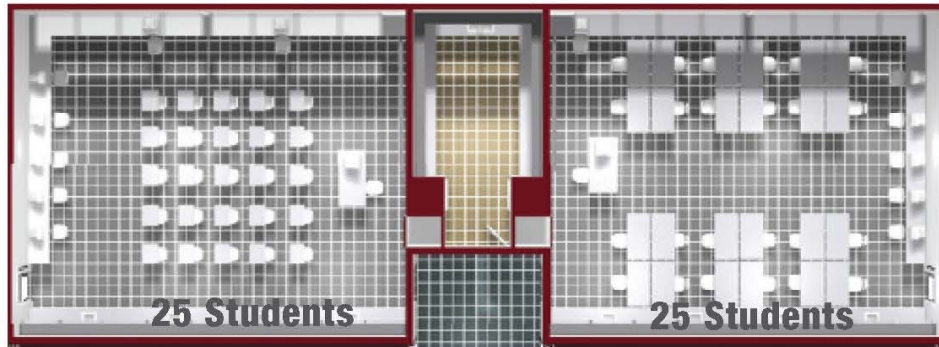
### Capacity Count Not Included:

*Kitchen, Cafeteria, Library, Restrooms, Auditoriums, Administrative, Mechanical Circulation*



# SCHOOL CAPACITY RE-DEFINED

## DESIGN CAPACITY



25 Students x 1 Classroom =	25
<u>25 Students x 1 Classroom =</u>	<u>25</u>
<b>Total:</b>	<b>50</b>

Utilization: Used 6 of 7 periods daily  
= 85% scheduling Factor

**Total Student Capacity  
= 43 students**

## FUNCTIONAL CAPACITY



25 Students x 1 Classroom =	25
<u>12 Students x 1 SPED Classroom =</u>	<u>12</u>
<b>Total:</b>	<b>37</b>

Utilization: Used 6 of 7 periods daily  
= 85% scheduling Factor

**Total Student Capacity  
= 32 students**



# PBK APPROACH



Townwest Elementary School				DESIGN CAPACITY		
Grades	20/21 Enrollment	Classification	Quantity	Room Capacity	TOTAL ROOM CAPACITY	
PREK-K		CLASSROOM (PREK-1)	12	22	264	
		CLASSROOM (2-5)	9	17	153	
					Subtotal 417	
					Enrollment 416	
					TOTAL 774	

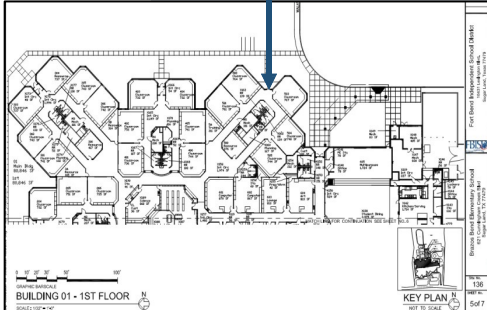
DESIGN CAPACITY						
Room Name	SF	Room Name (Per FBSD)	Classification	TOTAL	SEA Class Size	Room Capacity
327	811	NA	PULL OUT	0	0	0
328	878	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
329	750	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
330	878	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
334	829	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
335	878	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
339	878	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
340	878	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
341	750	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
342	750	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
343	750	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
344	829	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
345	878	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
346	829	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
349	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
401	750	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
402	750	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
404	750	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
407	750	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
408	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
409	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
410	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
411	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
412	750	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
413	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
414	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
415	750	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
416	888	Classroom (2-5)	CLASSROOM (2-5)	0	0	0
417	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
418	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
419	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
420	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
421	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
422	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
423	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
424	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
425	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
426	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
427	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
428	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
429	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
430	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
431	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
432	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
433	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
434	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
435	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
436	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
437	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
438	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
439	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
440	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
441	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
442	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
443	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
444	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
445	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
446	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
447	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
448	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
449	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
450	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
451	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
452	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
453	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
454	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
455	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
456	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
457	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
458	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
459	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
460	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
461	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
462	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
463	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
464	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
465	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
466	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
467	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
468	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
469	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
470	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
471	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
472	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
473	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
474	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
475	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
476	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
477	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
478	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
479	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
480	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
481	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
482	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
483	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
484	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0
485	878	Classroom (PREK-1)	CLASSROOM (PREK-1)	0	0	0

**Analyzed**  
Existing Floor Plans

**Updated**  
Floor plans after meeting with Principals

**Established**  
Room Capacity Standards and SQFT requirements

**Developed**  
Database to Calculate Capacities



EDUCATIONAL CAPACITY		SEA CAPACITY	
Room Capacity	Utilization %	Room Capacity	Minimum SF
Elementary CLASSROOM (PREK-1)	22	36	750
CLASSROOM (2-5)	12	32	650
SPED	-	40	480
PORTABLE - CLASSROOM (PREK-1)	NA	36	750
PORTABLE - CLASSROOM (2-5)	NA	32	650
PORTABLE - SPED	NA	40	480

Room Name (Per FBSD)	EDUCATIONAL CLASSIFICATION
Pre-School Program for Students with Disabilities	SPED
Self-Contained	SPED
Small	SPED
Specialized Classroom	SPED
OT/PT Lab	SPED
Lab/Work	SPED
Pre-K	CLASSROOM (PREK-1)
Kindergarten	CLASSROOM (PREK-1)
Classroom (PREK-1)	CLASSROOM (PREK-1)
1st Grade	CLASSROOM (2-5)
Classroom (2-5)	CLASSROOM (2-5)
Multi-purpose	CLASSROOM (2-5)
Computer	CLASSROOM (2-5)
Science	CLASSROOM (2-5)
Resource	CLASSROOM (2-5)
Distance Learning	CLASSROOM (2-5)
English Learning	CLASSROOM (2-5)
SQL	CLASSROOM (2-5)
2nd Grade	CLASSROOM (2-5)
3rd Grade	CLASSROOM (2-5)



## ROOM CAPACITY STANDARDS UTILIZED - ELEMENTARY

ELEMENTARY	ROOM CAPACITY	TEA MINIMUM PER STUDENT SF	TEA MINIMUM ROOM SF
Classroom (PREK-1)	22	36 SF	790 SF
Classroom (2-5)	22	32 SF	690 SF
Special Education	12	40 SF	480 SF

- **Scheduling Factor = 90%**

**SCHEDULING FACTOR** – The efficiency factor of the campus that allows for general fluctuations at the elementary school and accounts for teacher planning periods at middle and high schools.



## ROOM CAPACITY STANDARDS UTILIZED – INTERMEDIATE, MIDDLE & HIGH

MIDDLE / HIGH	ROOM CAPACITY	TEA MINIMUM PER STUDENT SF	TEA MINIMUM ROOM SF
Classroom (6-12), Art, Computer, Drama, Science	25	28 SF	690 SF
Competition Gym	75	NA	NA
Practice Gym	75	NA	NA
CTE, Specialty Labs & Classrooms	30	28 SF	690 SF
Band, Vocal	60	NA	NA
Fine Arts Sm / Md / Lg	15 / 40 / 60	NA	NA
Special Education	12	40 SF	480 SF

- **Scheduling Factor = 85%**



# 2021 DESIGN CAPACITY SUMMARY

	A	B	C	D	E	F
FACILITY	ENROLLMENT	DESIGN CAPACITY	CURRENT FUNCTIONAL CAPACITY	FUNCTIONAL CAPACITY UTILIZATION (A / C)	DESIGN CAPACITY UTILIZATION (A / B)	2020 PASA CAPACITY
HART ELEMENTARY SCHOOL	588	805	592	99%	73%	600
PUSTER ELEMENTARY SCHOOL	662	747	630	105%	89%	650
SLOAN CREEK INTERMEDIATE	658	1,004	895	74%	66%	850
WILLOW SPRINGS MIDDLE SCHOOL	785	1,111	947	83%	71%	850
LOVEJOY HIGH SCHOOL	1,639	1,952	1,853	88%	84%	2000

## VARIANCES & METHODOLOGY

- Scheduling factor for Design and Functional Capacity were the same for each school.
- Rooms that met the requirements of educational spaces were included in the design capacity regardless of how they are currently used.
- Excluded accessory Library space (i.e. Maker Space) and Ensemble Rooms in Intermediate and above.



# 2021 DESIGN CAPACITY SUMMARY

## OPTIMAL FUNCTIONAL CAPACITY

- Further analysis was done on campuses with high percentages of utilization.
- Rooms that could be readily utilized as educational spaces were added to the functional capacity to create the Optimal Functional capacity
  - These include rooms designed as education spaces being used for other functions, rooms utilized as pull-out spaces, etc.



# HART ELEMENTARY OPTIMAL FUNCTIONAL CAPACITY

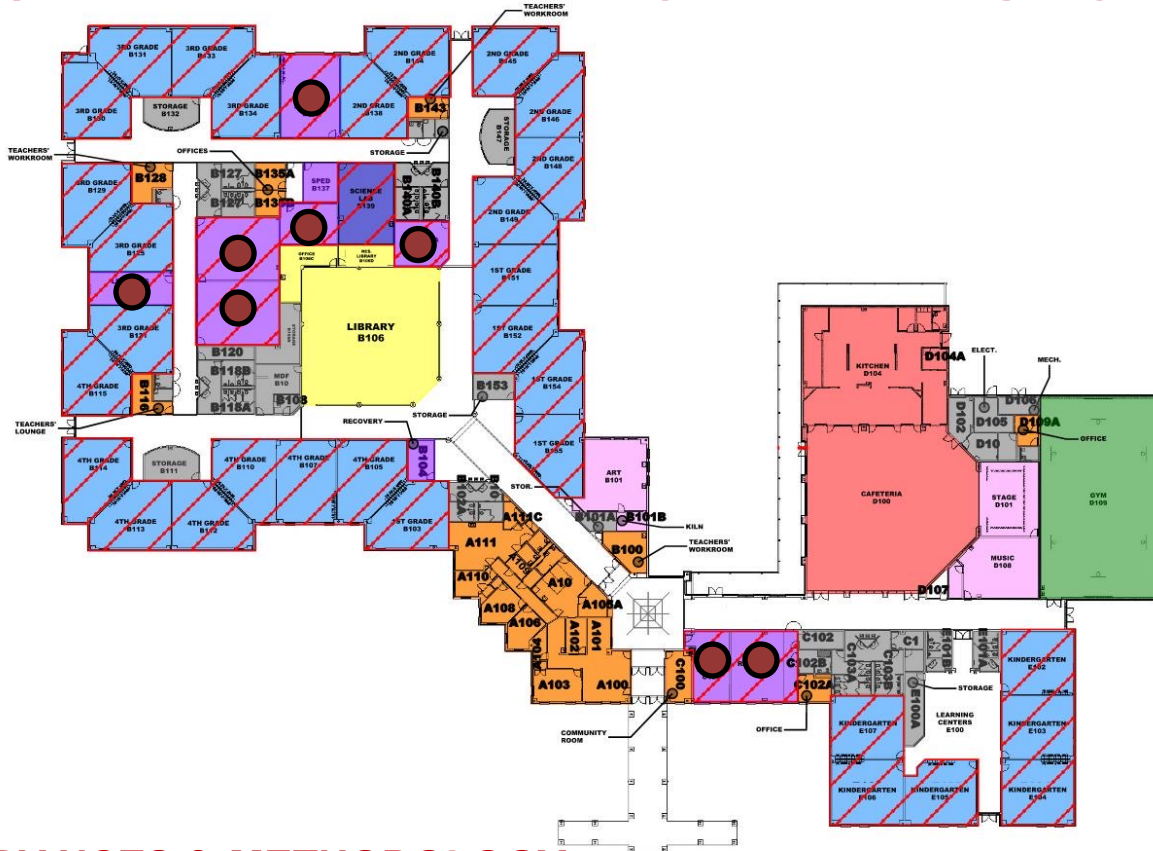


## VARIANCES & METHODOLOGY

- Rooms not included in the functional capacity that are being used as pull-out spaces and are not scheduled. These spaces could be readily used as scheduled learning spaces.
- Utilizing these spaces would increase the functional capacity to 675



# PUSTER ELEMENTARY OPTIMAL FUNCTIONAL CAPACITY



## VARIANCES & METHODOLOGY

- Rooms not included in the functional capacity that are being used as pull-out spaces and are not scheduled. These spaces could be readily used as scheduled learning spaces.
- Utilizing these spaces would increase the functional capacity to 738



# 2021 DESIGN CAPACITY SUMMARY

## OPTIMAL FUNCTIONAL CAPACITY

- Further analysis was done on campuses with high percentages of utilization.
- Rooms that could be readily utilized as educational spaces were added to the functional capacity to create the Optimal Functional capacity
  - These include rooms designed as education spaces being used for other functions, rooms utilized as pull-out spaces, etc.



	A	B	C	D	E	F	G
FACILITY	ENROLLMENT	DESIGN CAPACITY	CURRENT FUNCTIONAL CAPACITY	FUNCTIONAL CAPACITY UTILIZATION (A / C)	DESIGN CAPACITY UTILIZATION (A / B)	2020 PASA CAPACITY	OPTIMAL FUNCTIONAL CAPACITY
HART ELEMENTARY SCHOOL	588	805	592	99%	73%	600	675
PUSTER ELEMENTARY SCHOOL	662	747	630	105%	89%	650	738



6. Demographic Study Presentation

**Presenter:** Dr. Jennifer DuPlessis, Assistant Superintendent of Finance and Operations



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT  
EST. 1917

# Lovejoy ISD

District  
Demographics  
Update

2021 / 22

*February 3, 2022*



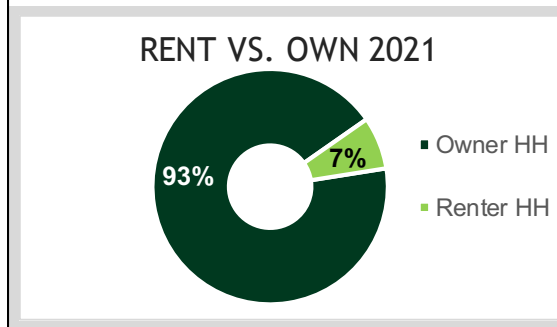
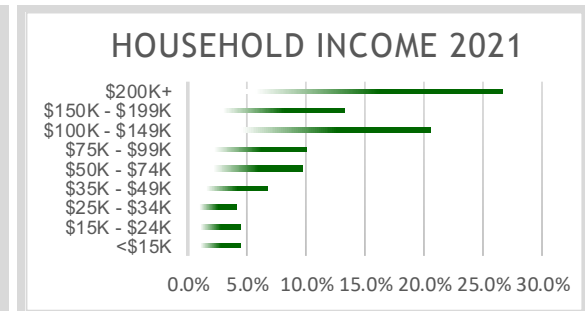
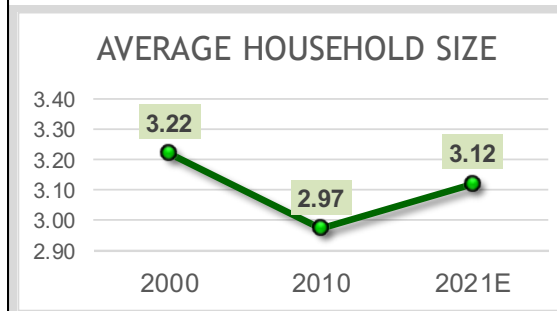
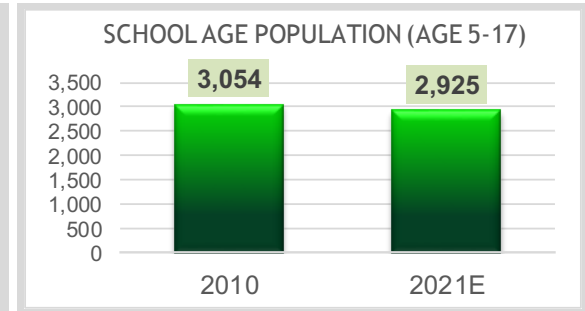
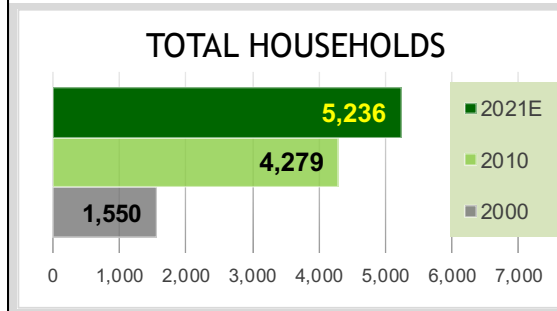
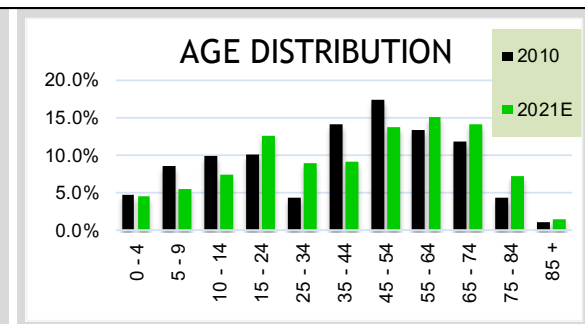
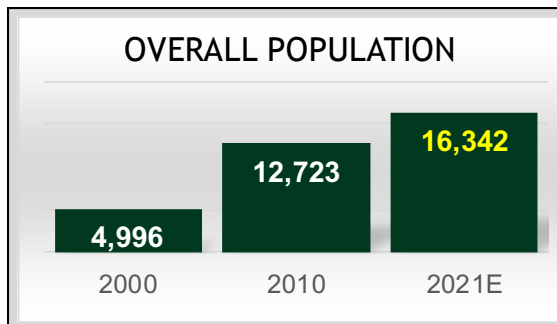
School District Strategies  
*Solutions Through Demographics*



# LOVEJOY ISD POPULATION AND HOUSEHOLD GROWTH: 2021 ESTIMATES

- Lovejoy ISD's overall population in 2021 is estimated to be 16,342
- In 2021, the district is estimated to have 5,236 total households (HH)
- LISD's overall population is estimated to have grown by 28% since the 2010 Census (+3,619)
- The total number of HH's in LISD is estimated to have increased 22% since 2010 (+957)
- LISD's Student Age Residents per Household is estimated to be 0.56
- Median HH Income in LISD is now \$120,228  
Collin Co. = \$95,475     DFW = \$73,903

*\*Official 2020 Census results expected to be released in March 2022*



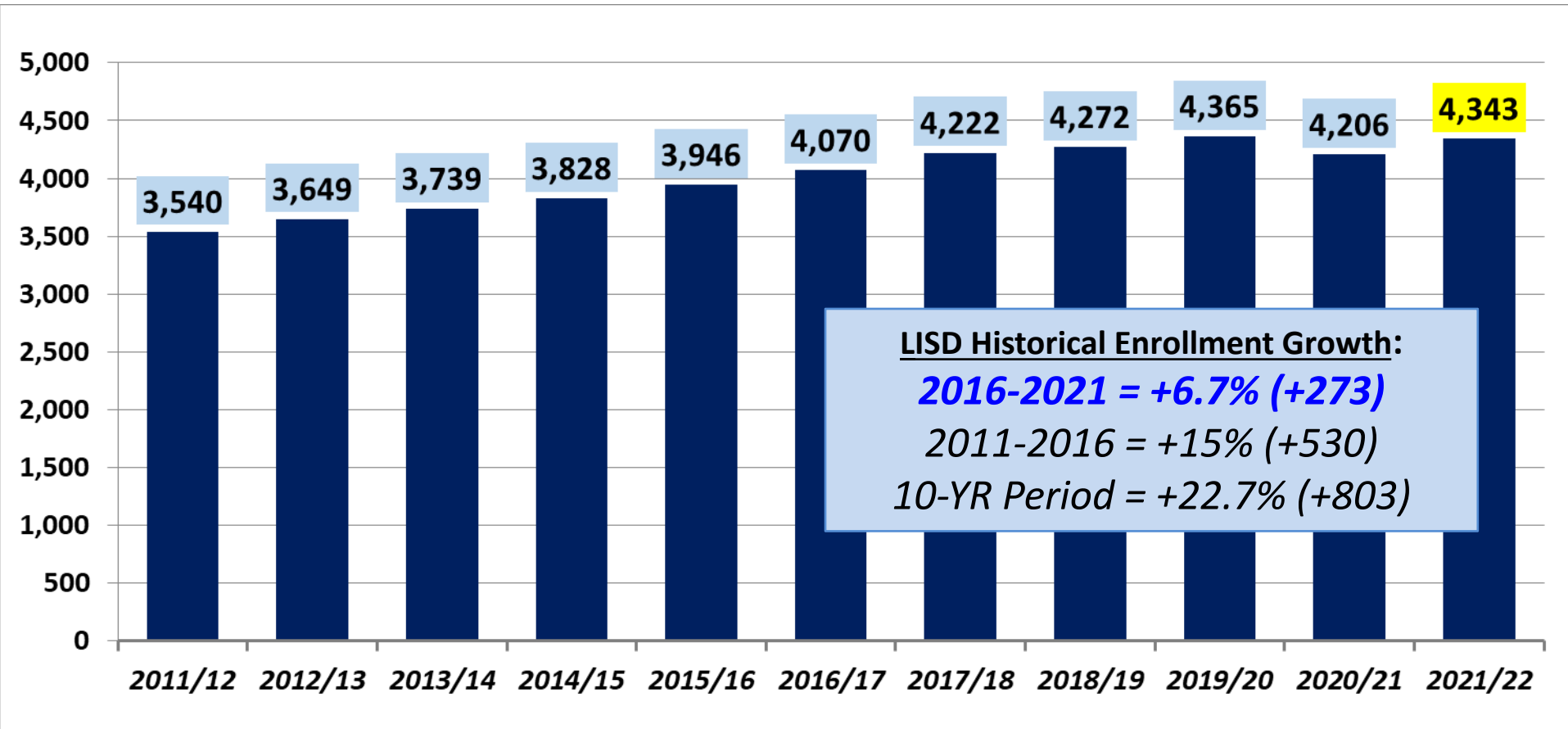
	2010	2021E	2026P
Hispanic Origin	7.1%	8.8%	10.0%
Student Age Per HH	0.71	0.56	0.52
Age 0-4 Population	598	735	858
		23.0%	16.7%
Age 65+	17.3%	22.9%	25.8%
% of HH Earning <\$50K		19.8%	16.5%

Source: Esri & U.S. Census Bureau





# LOVEJOY ISD ENROLLMENT HISTORY (PK-12): FALL 2011-FALL 2021



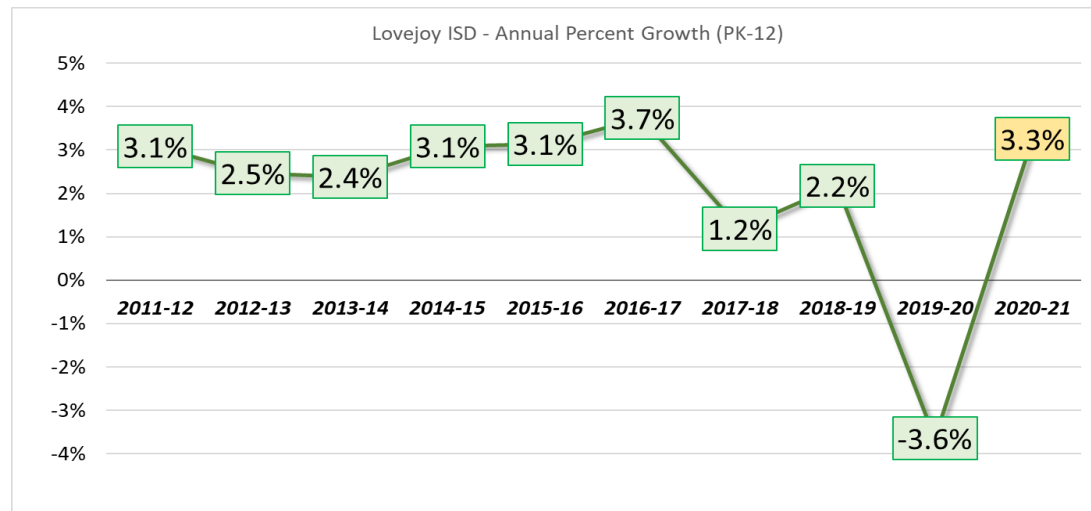
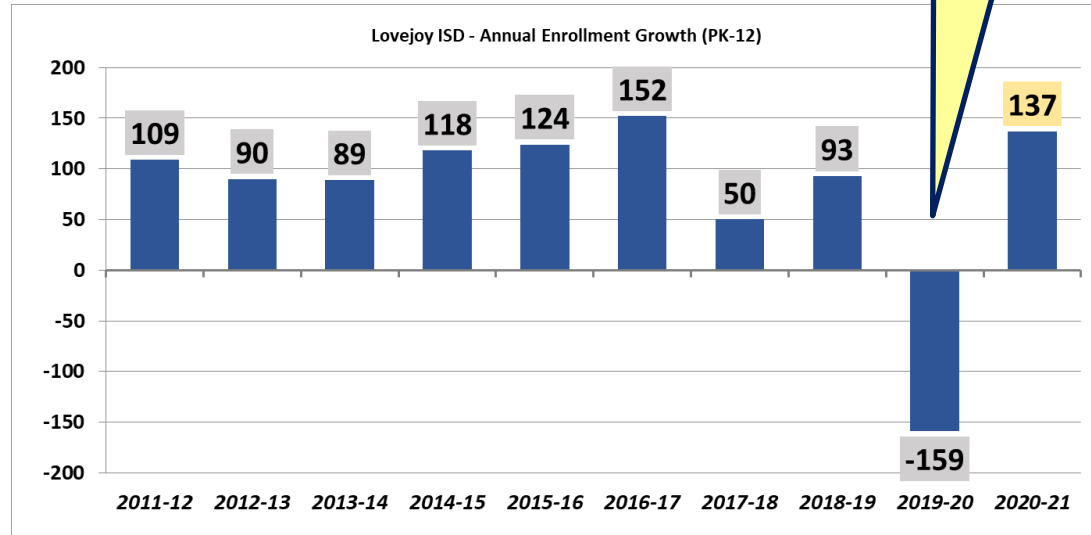
- District enrollment as of the Fall 2021 snapshot date was 4,343



# LOVEJOY ISD ENROLLMENT HISTORY: ANNUAL GROWTH 2011/12 - 2021/22

COVID-19  
Pandemic impact

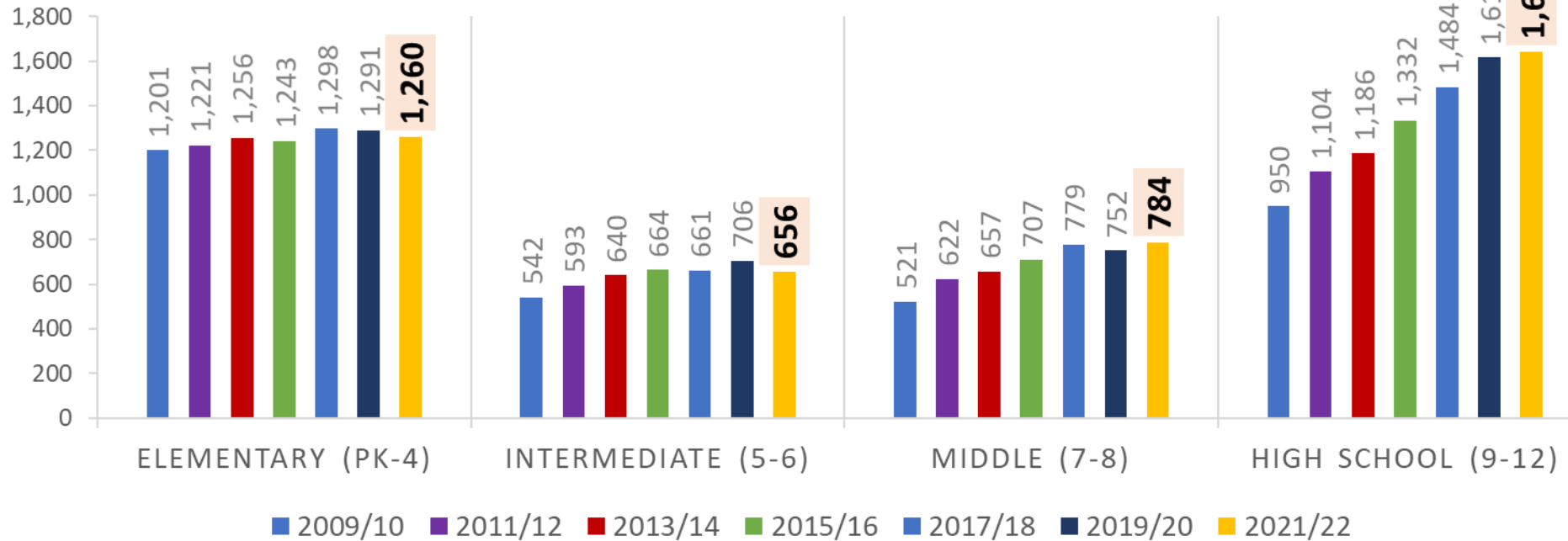
- COVID-19 environment impacts LISD's enrollment from 2019 to 2020, like many other districts in Texas that lost 2-4% of previously enrolled students
- District enrollment increased by 137 students from 2020 to 2021 (+3.3%)
- LISD enrollment has grown 9 out of the past 10 years
- 3-year average annual growth now +0.6%
- 5-year average annual growth now +1.3%





# LOVEJOY ISD ENROLLMENT HISTORY: GROWTH BY ATTENDANCE LEVEL: FALL 2011-2021

HISTORICAL ENROLLMENT BY ATTENDANCE LEVEL



Enrollment totals shown in 2-year increments



# LOVEJOY ISD ENROLLMENT HISTORY: GROWTH BY GRADE LEVEL

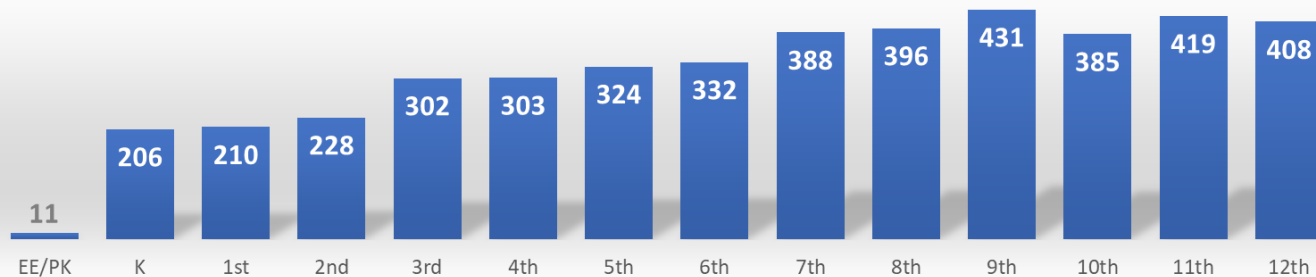
  = Record class size

  = District high

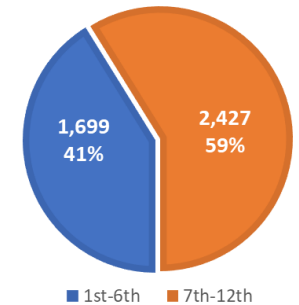


Year (Fall)	ELEMENTARY						INTERMED.		MIDDLE		HIGH				District Total	Annual Growth	Percent Change
	EE/PK	K	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th			
2006/07	4	177	223	223	201	199	214	228	212	217	183	0	0	0	2,081		
2007/08	8	204	215	238	242	218	220	242	252	226	234	191	0	0	2,490	409	19.7%
2008/09	6	200	223	234	257	273	231	245	263	261	251	229	190	0	2,863	373	15.0%
2009/10	7	210	210	248	257	269	282	260	249	272	272	254	234	190	3,214	351	12.3%
2010/11	5	189	231	228	262	276	277	298	279	263	292	284	254	231	3,369	155	4.8%
2011/12	10	188	225	242	267	289	296	297	325	297	277	294	287	246	3,540	171	5.1%
2012/13	14	204	200	264	267	291	309	302	323	324	310	279	283	279	3,649	109	3.1%
2013/14	17	213	234	208	291	293	313	327	316	341	334	312	266	274	3,739	90	2.5%
2014/15	20	200	221	269	227	311	311	331	351	328	360	331	305	263	3,828	89	2.4%
2015/16	22	190	230	245	297	259	321	343	341	366	345	363	324	300	3,946	118	3.1%
2016/17	20	198	222	238	283	313	286	350	372	356	389	355	366	322	4,070	124	3.1%
2017/18	15	224	216	250	284	309	354	307	386	393	374	394	349	367	4,222	152	3.7%
2018/19	19	212	251	243	275	314	335	370	332	393	407	382	393	346	4,272	50	1.2%
2019/20	22	193	245	269	267	295	349	357	402	350	420	423	375	398	4,365	93	2.2%
2020/21	17	171	196	264	273	280	301	362	371	402	367	423	401	378	4,206	-159	-3.6%
2021/22	11	206	210	228	302	303	324	332	388	396	431	385	419	408	4,343	137	3.3%

2021/22 GRADE LEVEL TOTALS



2021/22



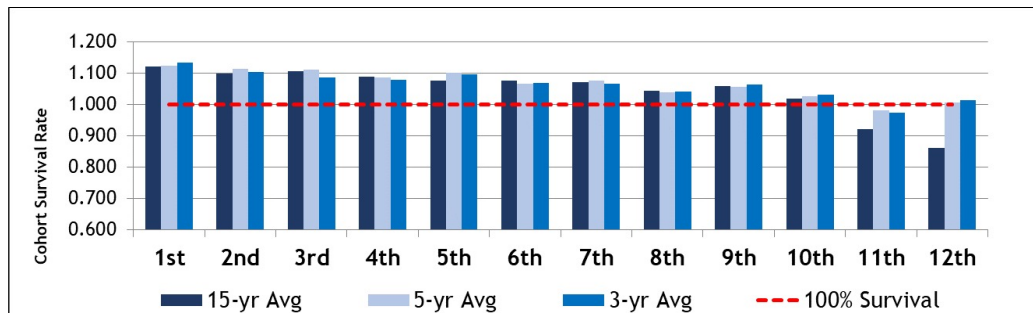


# LISD ENROLLMENT HISTORY: COHORT SURVIVAL RATES BY GRADE

Rate reflects the percentage of students in the current grade that have moved up from the previous year and previous grade



Grade	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
2007/08	1.215	1.067	1.085	1.085	1.106	1.131	1.105	1.066	1.078	1.044	0.000	0.000
2008/09	1.093	1.088	1.080	1.128	1.060	1.114	1.087	1.036	1.111	0.979	0.995	0.000
2009/10	1.050	1.112	1.098	1.047	1.033	1.126	1.016	1.034	1.042	1.012	1.022	1.000
2010/11	1.100	1.086	1.056	1.074	1.030	1.057	1.073	1.056	1.074	1.044	1.000	0.987
2011/12	1.190	1.048	1.171	1.103	1.072	1.072	1.091	1.065	1.053	1.007	1.011	0.969
2012/13	1.064	1.173	1.103	1.090	1.069	1.020	1.088	0.997	1.044	1.007	0.963	0.972
2013/14	1.147	1.040	1.102	1.097	1.076	1.058	1.046	1.056	1.031	1.006	0.953	0.968
2014/15	1.038	1.150	1.091	1.069	1.061	1.058	1.073	1.038	1.056	0.991	0.978	0.989
2015/16	1.150	1.109	1.104	1.141	1.032	1.103	1.030	1.043	1.052	1.008	0.979	0.984
2016/17	1.168	1.035	1.155	1.054	1.104	1.090	1.085	1.044	1.063	1.029	1.008	0.994
2017/18	1.091	1.126	1.193	1.092	1.131	1.073	1.103	1.056	1.051	1.013	0.983	1.003
2018/19	1.121	1.125	1.100	1.106	1.084	1.045	1.081	1.018	1.036	1.021	0.997	0.991
2019/20	1.156	1.072	1.099	1.073	1.111	1.066	1.086	1.054	1.069	1.039	0.982	1.013
2020/21	1.016	1.078	1.015	1.049	1.020	1.037	1.039	1.000	1.049	1.007	0.948	1.008
2021/22	1.228	1.163	1.144	1.110	1.157	1.103	1.072	1.067	1.072	1.049	0.991	1.017
<b>15-yr Avg</b>	<b>1.122</b>	<b>1.098</b>	<b>1.107</b>	<b>1.088</b>	<b>1.076</b>	<b>1.077</b>	<b>1.072</b>	<b>1.042</b>	<b>1.059</b>	<b>1.017</b>	<b>0.921</b>	<b>0.860</b>
<b>5-yr Avg</b>	<b>1.122</b>	<b>1.113</b>	<b>1.110</b>	<b>1.086</b>	<b>1.101</b>	<b>1.065</b>	<b>1.076</b>	<b>1.039</b>	<b>1.055</b>	<b>1.026</b>	<b>0.980</b>	<b>1.006</b>
<b>3-yr Avg</b>	<b>1.133</b>	<b>1.104</b>	<b>1.086</b>	<b>1.077</b>	<b>1.096</b>	<b>1.069</b>	<b>1.066</b>	<b>1.041</b>	<b>1.063</b>	<b>1.032</b>	<b>0.973</b>	<b>1.013</b>

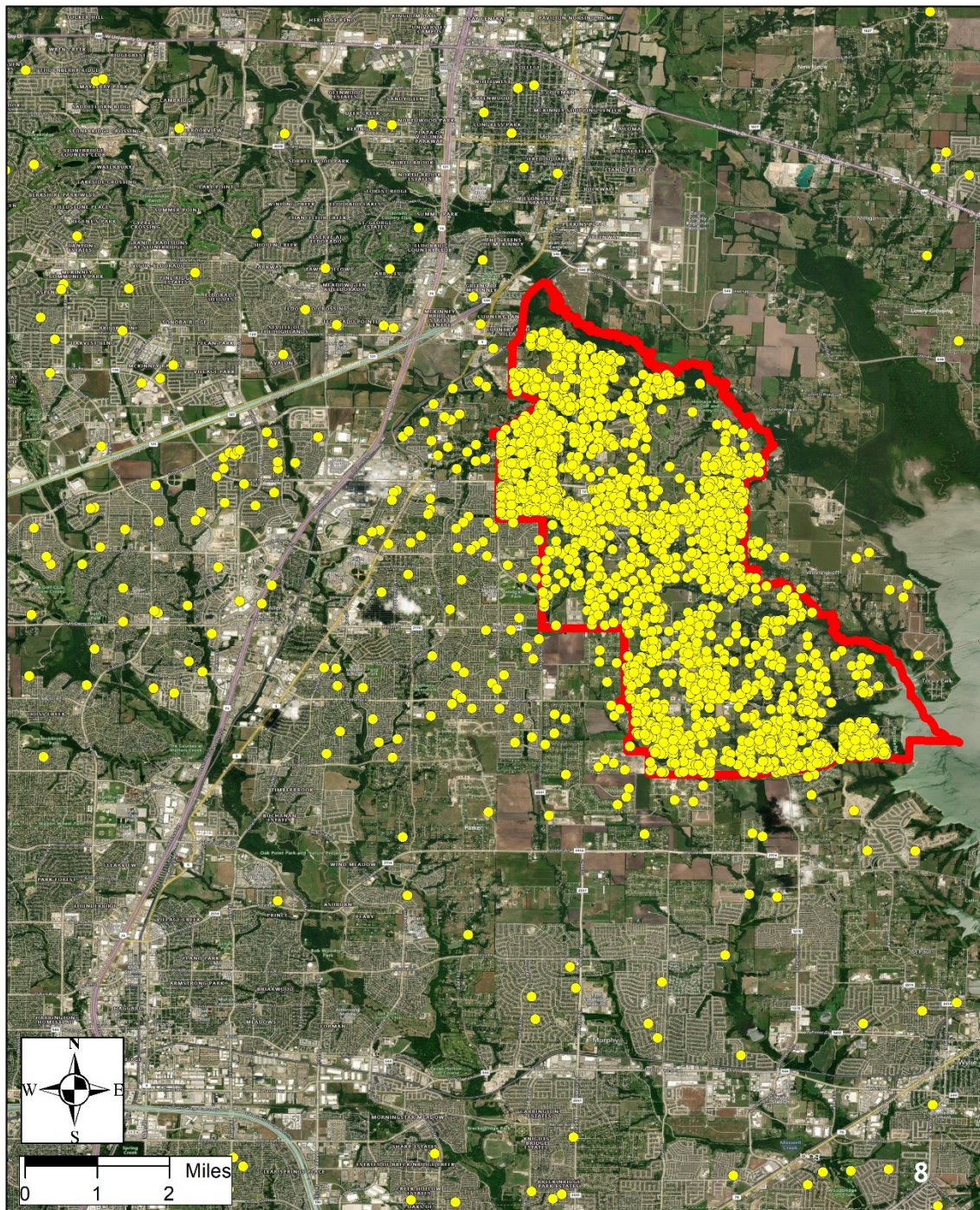


# LOVEJOY ISD STUDENT GEO-CODING 2021/22

- *4,343 students geo-coded in Fall 2021*
- *88.3% of enrolled students live within the district boundary (3,833 students)*
- *11.7% transfer into the district (510)*

## Out-of-District Transfers Fall 2021

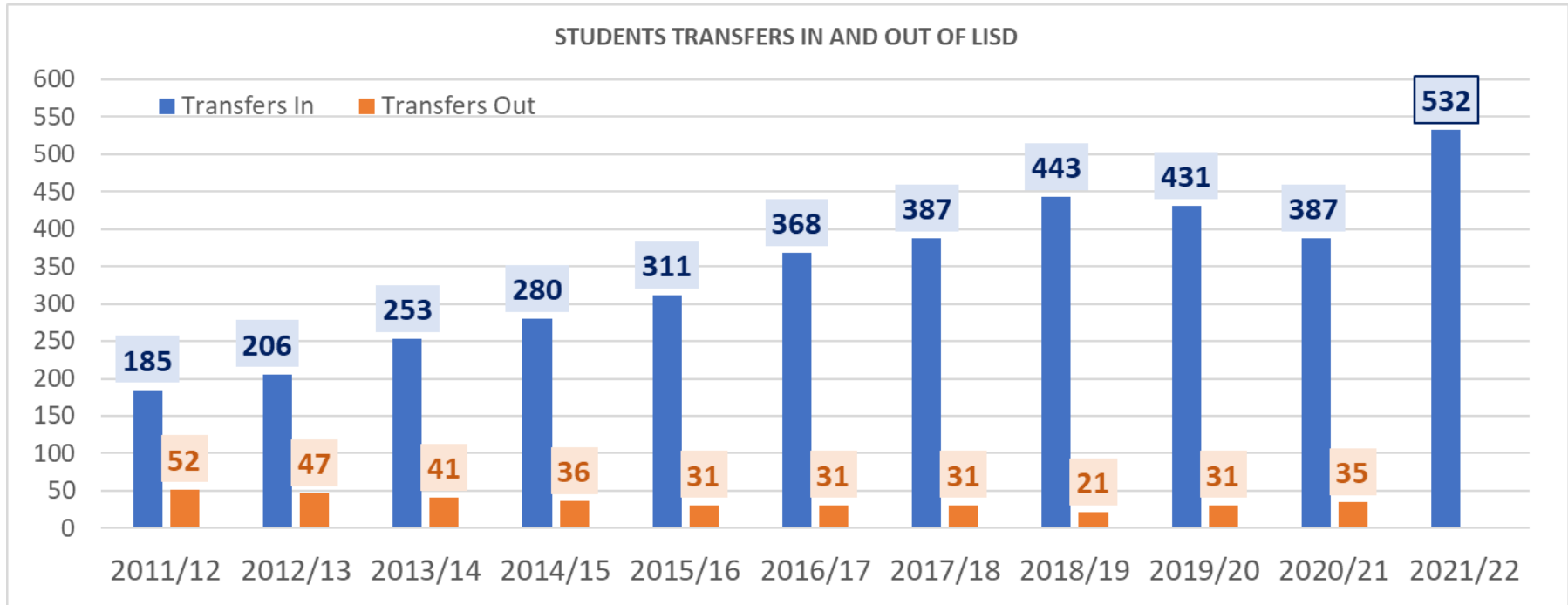
Allen ISD	169
McKinney ISD	108
Plano ISD	52
Wylie ISD	51
Princeton ISD	31





# LOVEJOY ISD STUDENT TRANSFERS IN AND OUT OF DISTRICT

PEIMS data reflects counts of students residing in one district and attending another.



Source: TEA Student Transfers Report

- Since the TEA began producing the Student Transfer Report in 2011/12, LISD has averaged 36 transfers out of the district each year
- The amount of students allowed to transfer into the district steadily increased from 2011 to 2018, topping out near 445 students
- From 2018 to 2020, the number of students transferring into the district declined to under 390 students
- In 2021/22, LISD increases the number of transfers-in students to 532



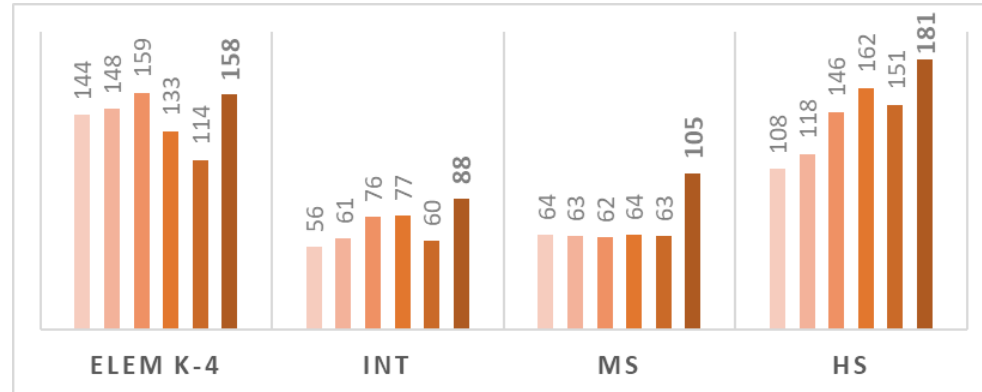
# LOVEJOY ISD TRANSFER STUDENT ENROLLMENT HISTORY: 2016/17 - 2021/22

## Lovejoy ISD Transfer-In History (All)

Year (Fall)	ELEMENTARY						INTERMED.		MIDDLE		HIGH				District Total	Annual Growth	Percent Change
	EE/PK	K	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th			
2016/17	0	31	22	29	36	26	28	28	32	32	37	29	15	27	<b>372</b>		
2017/18	0	27	32	20	33	36	37	24	28	35	36	39	25	18	<b>390</b>	18	4.8%
2018/19	0	36	29	28	26	40	40	36	33	29	35	43	43	25	<b>443</b>	53	13.6%
2019/20	0	17	37	19	35	25	39	38	32	32	36	38	44	44	<b>436</b>	-7	-1.6%
2020/21	0	13	17	34	20	30	21	39	35	28	37	33	37	44	<b>388</b>	-48	-11.0%
2021/22	0	46	19	24	39	30	48	40	48	57	49	54	36	42	<b>532</b>	144	37.1%

## All Transfers by Attendance Level

	Elem K-4	Int	MS	HS	Total
2016/17	144	56	64	108	<b>372</b>
2017/18	148	61	63	118	<b>390</b>
2018/19	159	76	62	146	<b>443</b>
2019/20	133	77	64	162	<b>436</b>
2020/21	114	60	63	151	<b>388</b>
2021/22	158	88	105	181	<b>532</b>

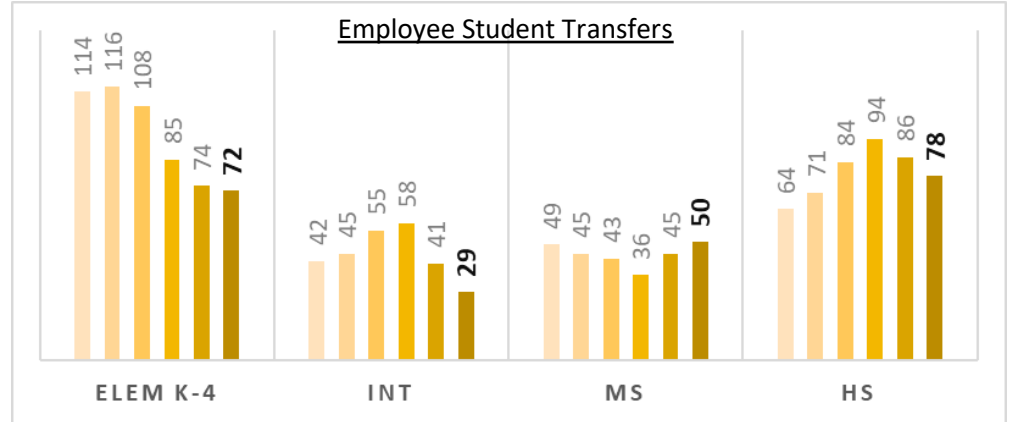




# LOVEJOY ISD TRANSFER STUDENT ENROLLMENT LISD EMPLOYEE VS. NON-EMPLOYEE STUDENTS

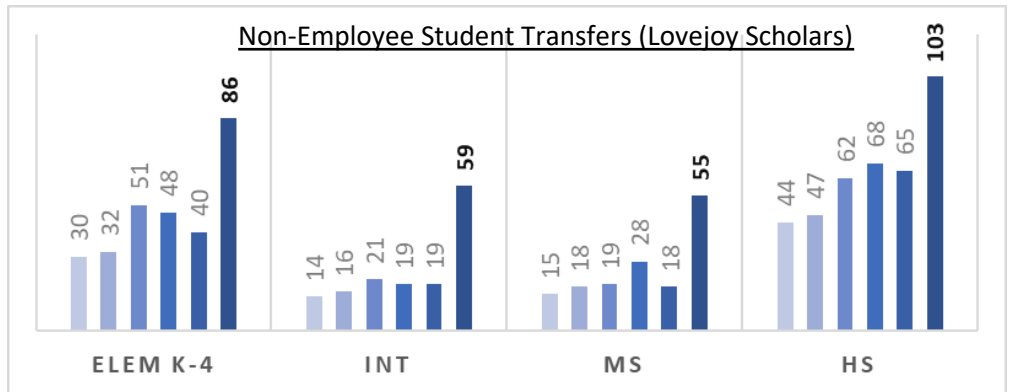
**Employee Student Transfers by Attendance Level**

	Elem K-4	Int	MS	HS	Total
2016/17	114	42	49	64	<b>269</b>
2017/18	116	45	45	71	<b>277</b>
2018/19	108	55	43	84	<b>290</b>
2019/20	85	58	36	94	<b>273</b>
2020/21	74	41	45	86	<b>246</b>
2021/22	72	29	50	78	<b>229</b>



**Non-Employee Student Transfers by Attendance Level**

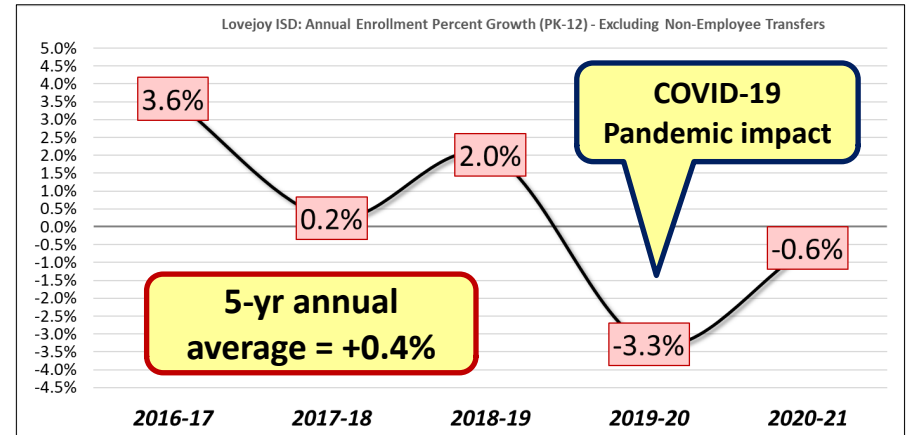
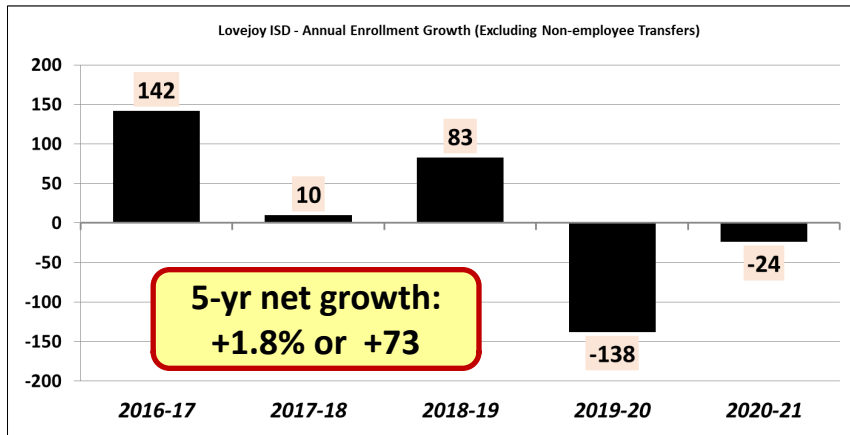
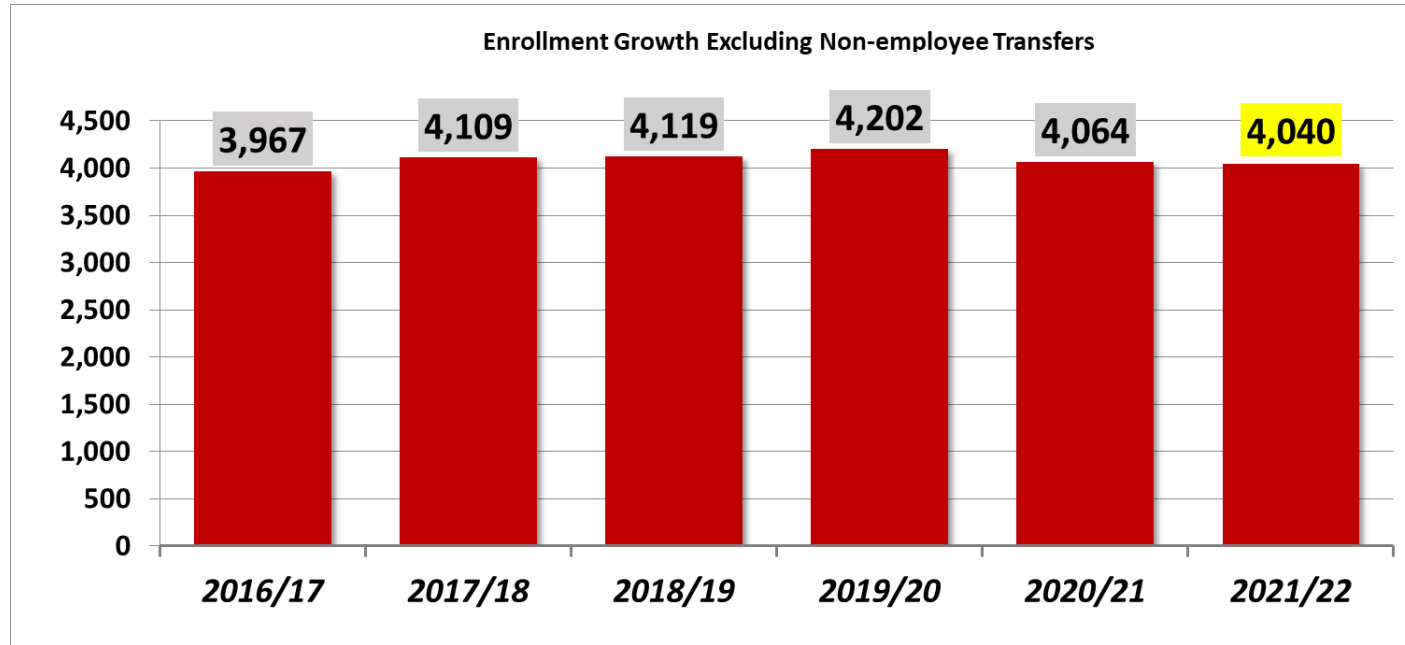
	Elem K-4	Int	MS	HS	Total
2016/17	30	14	15	44	<b>103</b>
2017/18	32	16	18	47	<b>113</b>
2018/19	51	21	19	62	<b>153</b>
2019/20	48	19	28	68	<b>163</b>
2020/21	40	19	18	65	<b>142</b>
2021/22	86	59	55	103	<b>303</b>



\*Annual data as of fall snapshot date



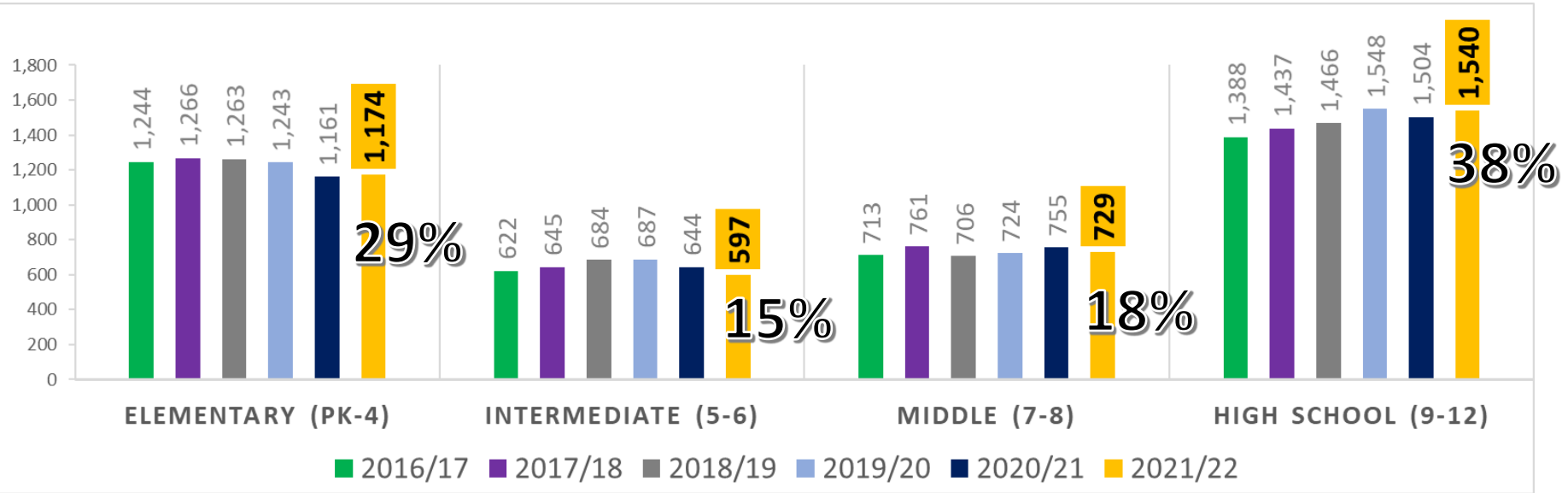
# LOVEJOY ISD ENROLLMENT HISTORY RESIDENT STUDENTS ONLY



\*Student totals represent true resident and employee transfers combined



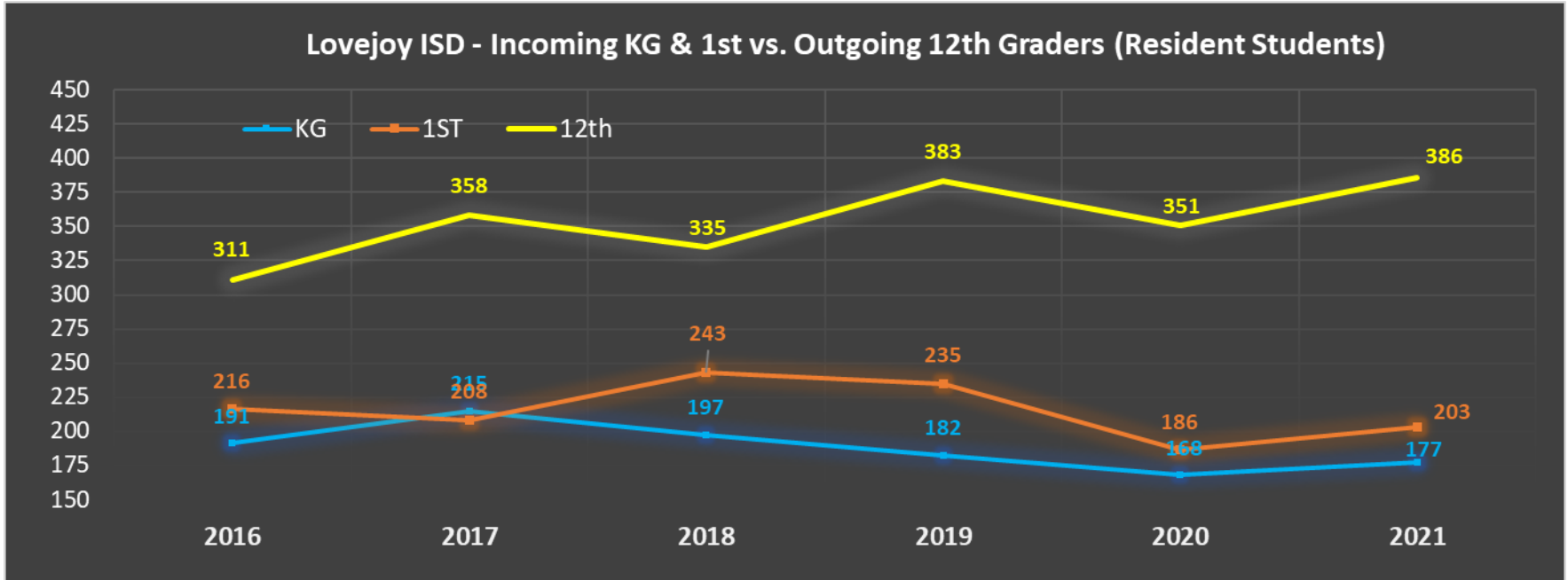
# LOVEJOY ISD ENROLLMENT HISTORY RESIDENT STUDENTS ONLY



Year (Fall)	PK	ELEMENTARY					INTERMEDIATE		MIDDLE		HIGH SCHOOL				District Total	Annual Growth	Percent Change
	EE/PK	K	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th			
2016/17	20	191	216	233	277	307	280	342	367	346	376	342	359	311	3,967		
2017/18	15	215	208	245	277	306	341	304	376	385	358	382	339	358	4,109	142	3.6%
2018/19	19	197	243	237	264	303	327	357	323	383	399	355	377	335	4,119	10	0.2%
2019/20	22	182	235	266	253	285	340	347	386	338	408	409	348	383	4,202	83	2.0%
2020/21	17	168	186	256	264	270	291	353	364	391	355	412	386	351	4,064	-138	-3.3%
2021/22	11	177	203	212	285	286	293	304	363	366	401	351	402	386	4,040	-24	-0.6%

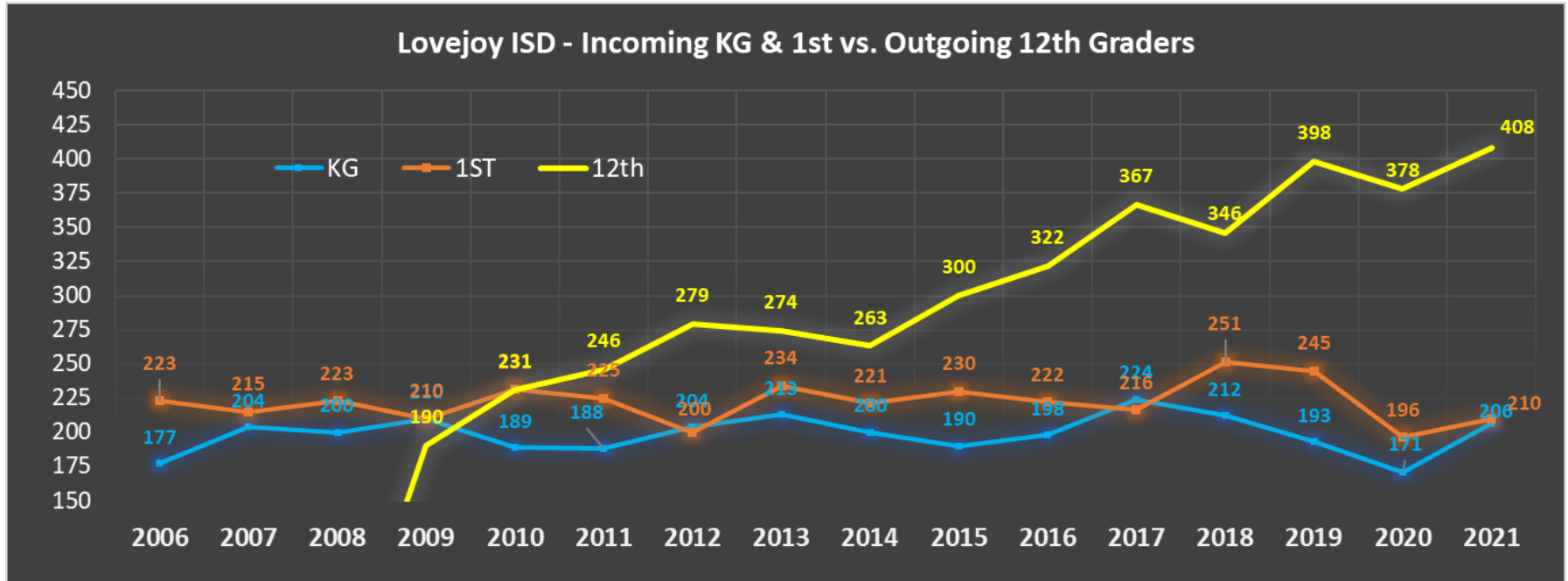
\*Student totals represent true resident and employee transfers combined

# INCOMING KG & 1<sup>ST</sup> GRADE OUTGOING 12<sup>TH</sup> GRADE STUDENTS: RESIDENT STUDENTS ONLY



- The gap between incoming KG and 1<sup>st</sup> Grade students and outgoing 12 grade resident students has widened over the past three years
- Currently, the average class size from Grades 10-12 is 380 students, compared to average of 197 students in KG-2 (difference of 183 students)
- Resident enrollment poised to decline

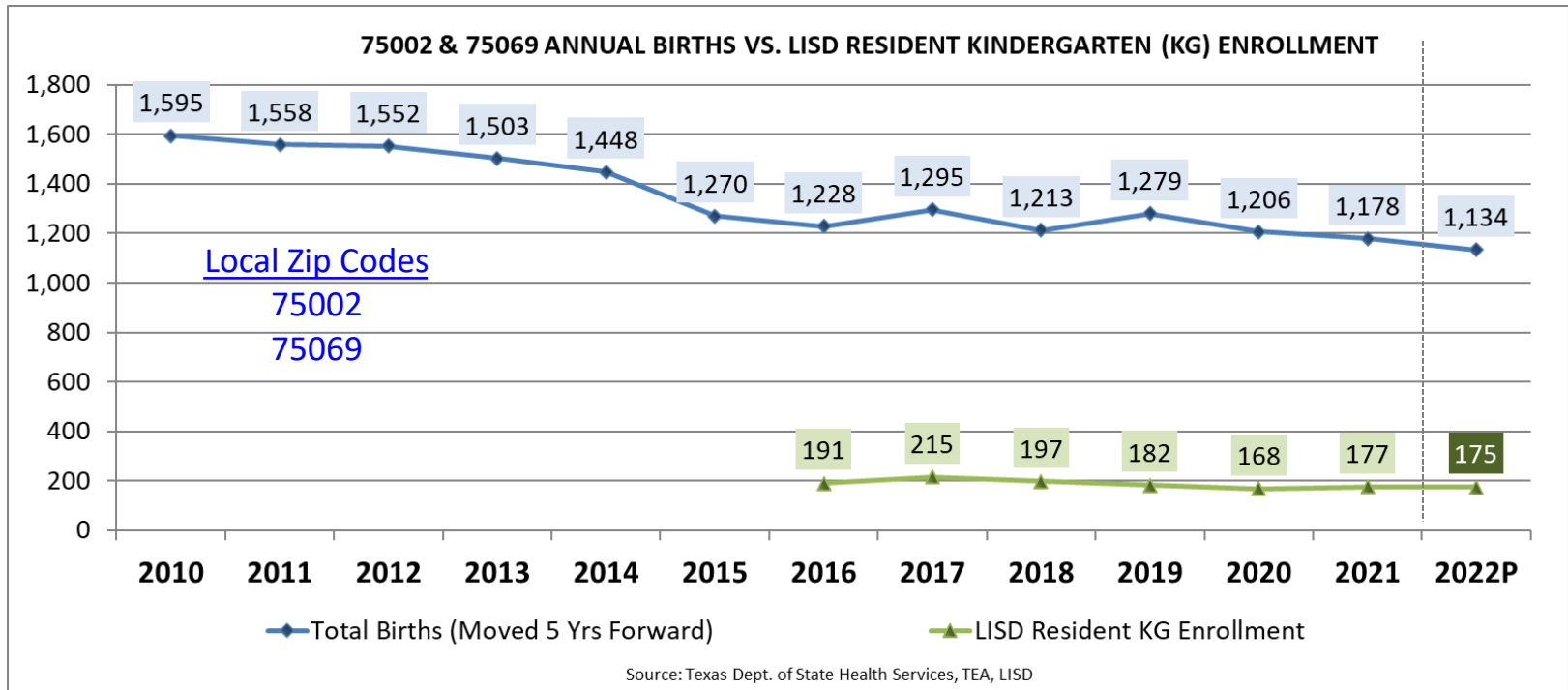
# INCOMING KG & 1<sup>ST</sup> GRADE OUTGOING 12<sup>TH</sup> GRADE STUDENTS: ALL ENROLLED STUDENTS



- The gap between incoming KG and 1<sup>st</sup> Grade students and outgoing 12 grade students continues to widen
- Currently, the average class size from Grades 10-12 is 404 students, compared to average of 215 students in KG-2<sup>nd</sup> (difference of 189)

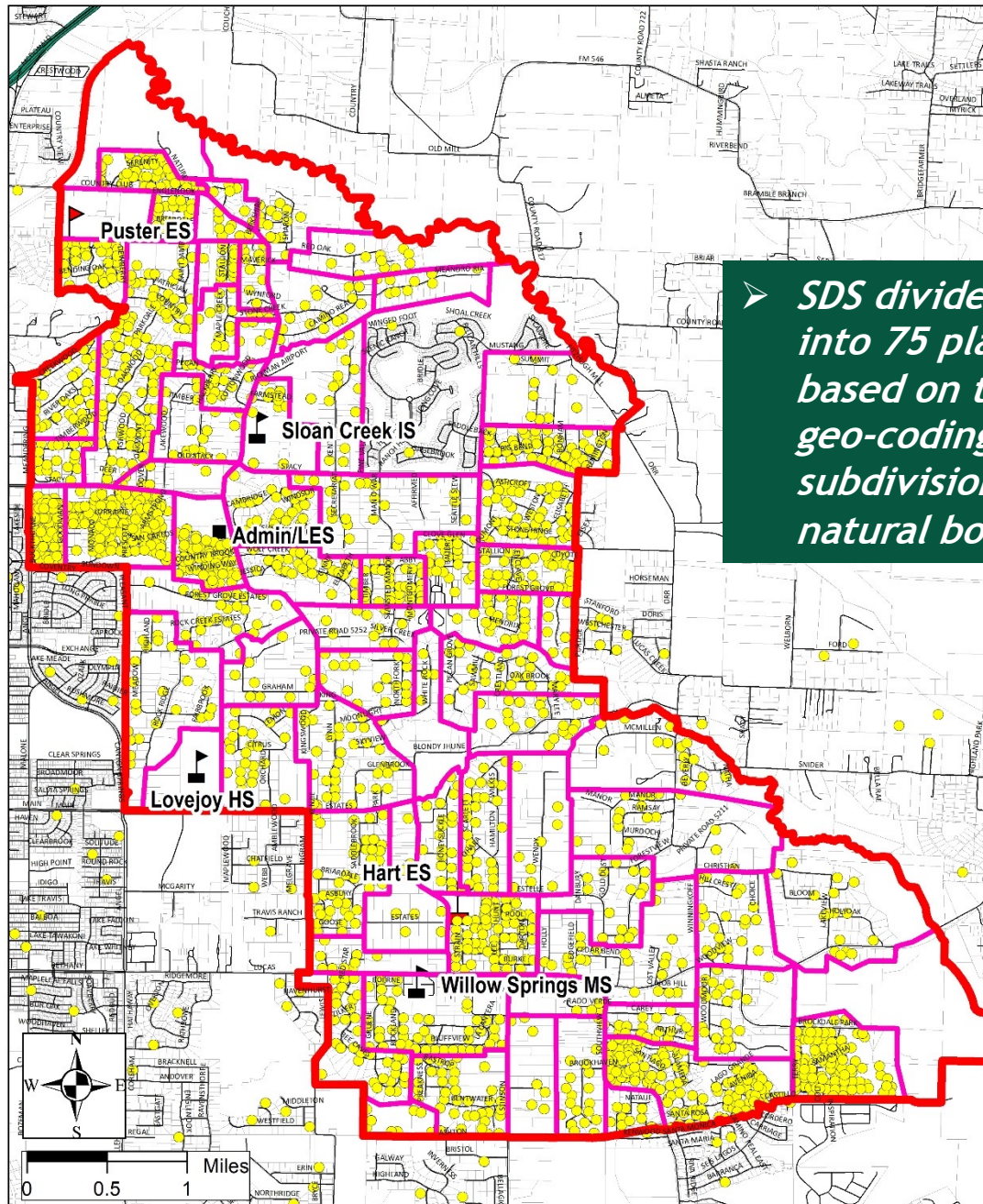


# LOCAL BIRTH COUNTS VS. KINDERGARTEN ENROLLMENT



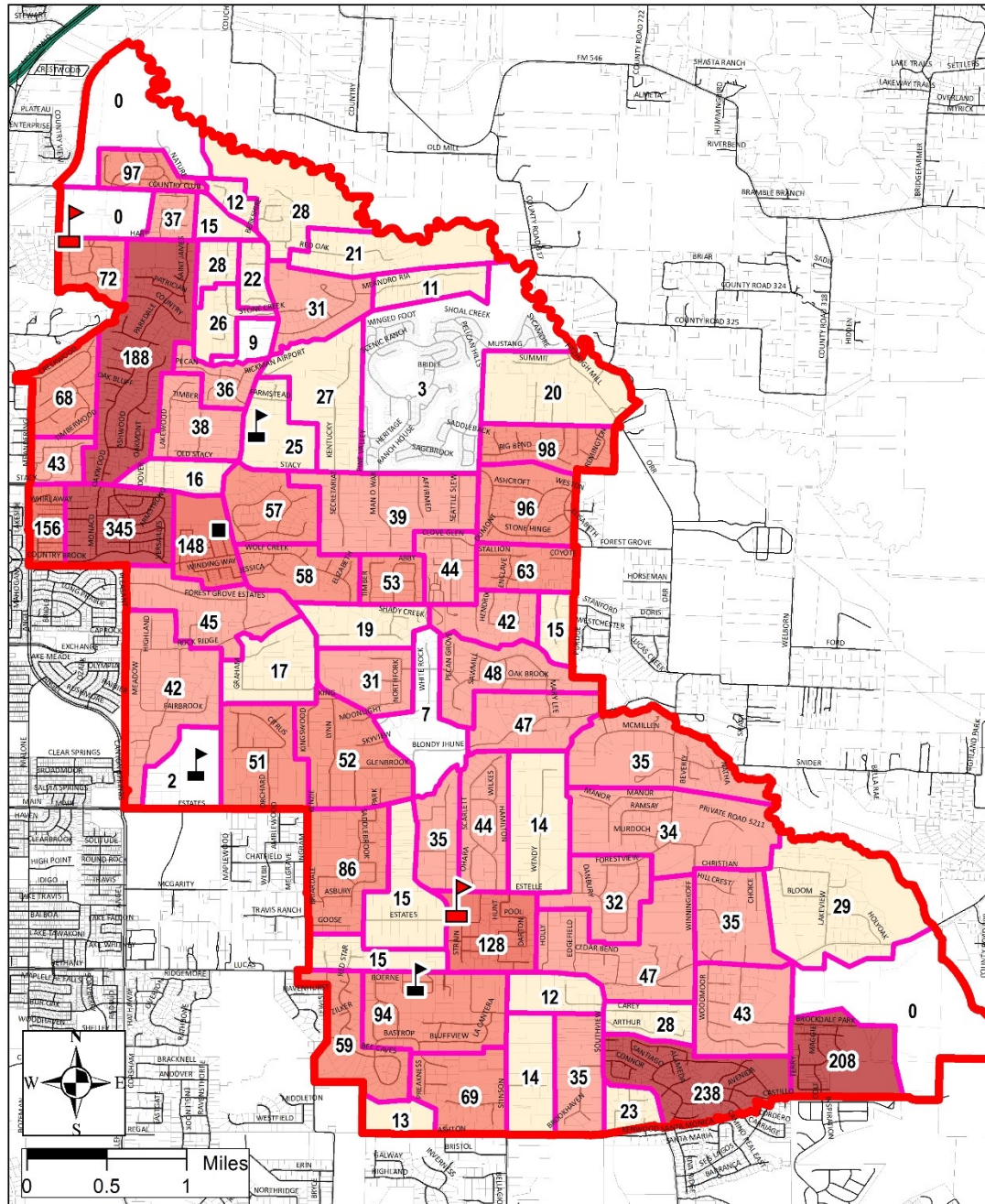
- The total number of annual births in local zip codes has been declining since 2005
- In 2017 (latest year data is available), the area birth rate dipped to the lowest total in 13 years
- Birth rate indicates that Lovejoy ISD should see about 175 resident kindergarten students next fall

# LOVEJOY ISD PLANNING AREAS

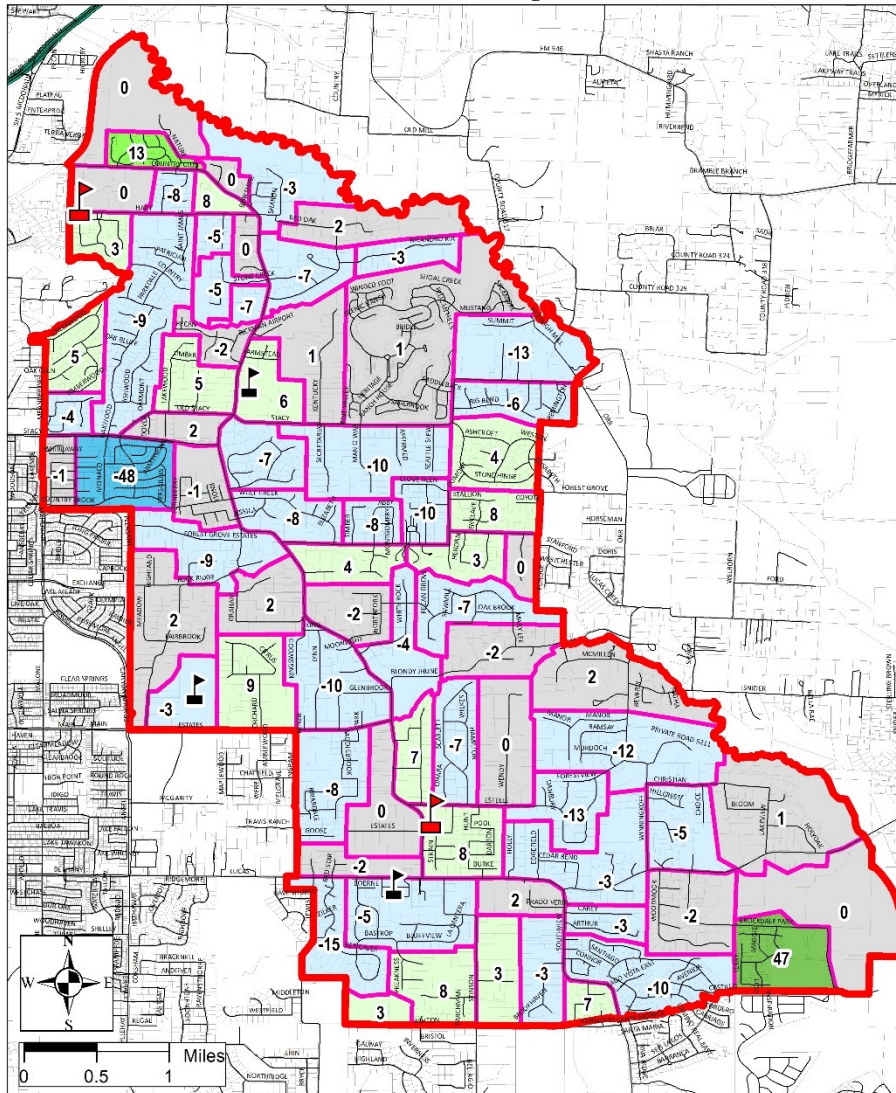


➤ *SDS divided the district into 75 planning areas based on the student geo-coding, roadways, subdivisions, and natural boundaries*

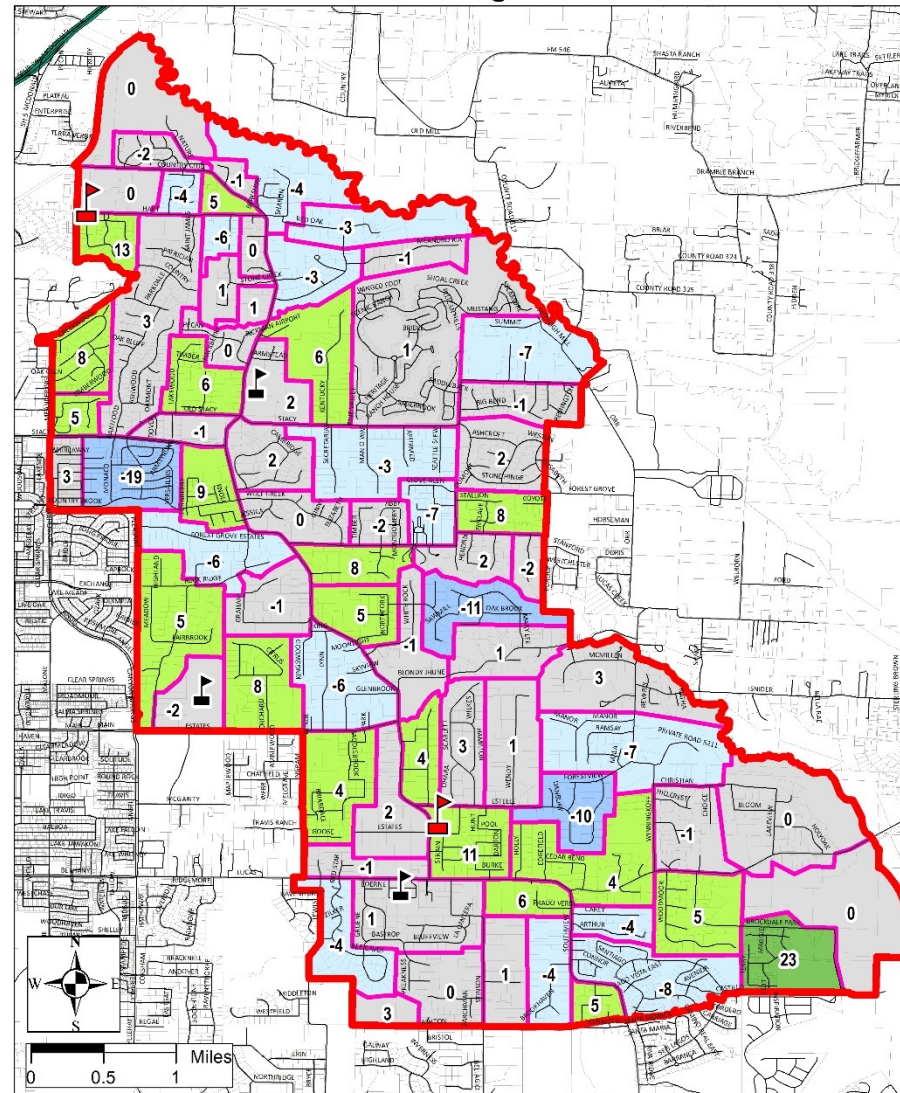
# TOTAL STUDENTS (PK-12) BY PLANNING AREAS 2021/22



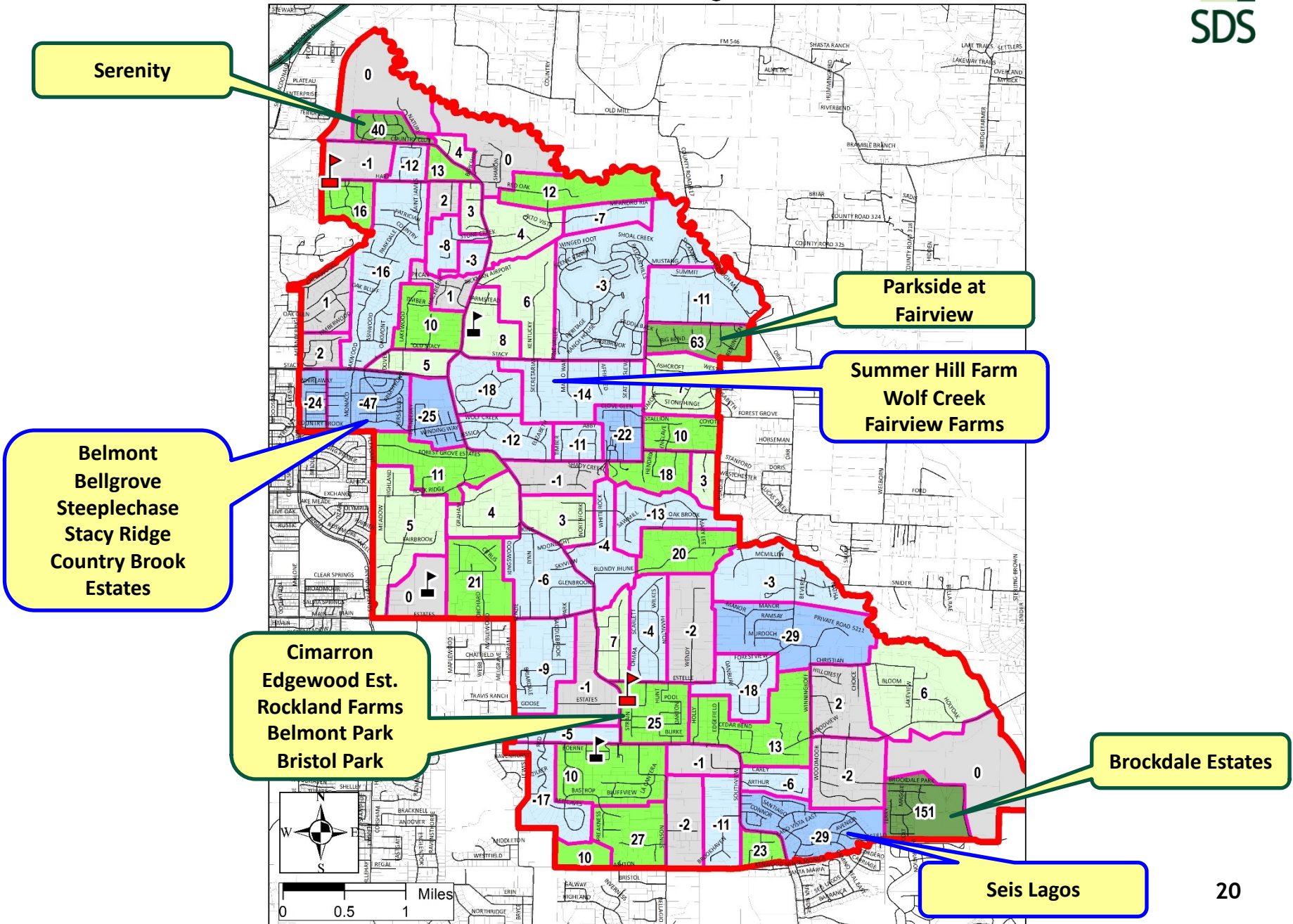
Lovejoy Independent School District  
2-Year Overall Enrollment Change Fall 2019-Fall 2021



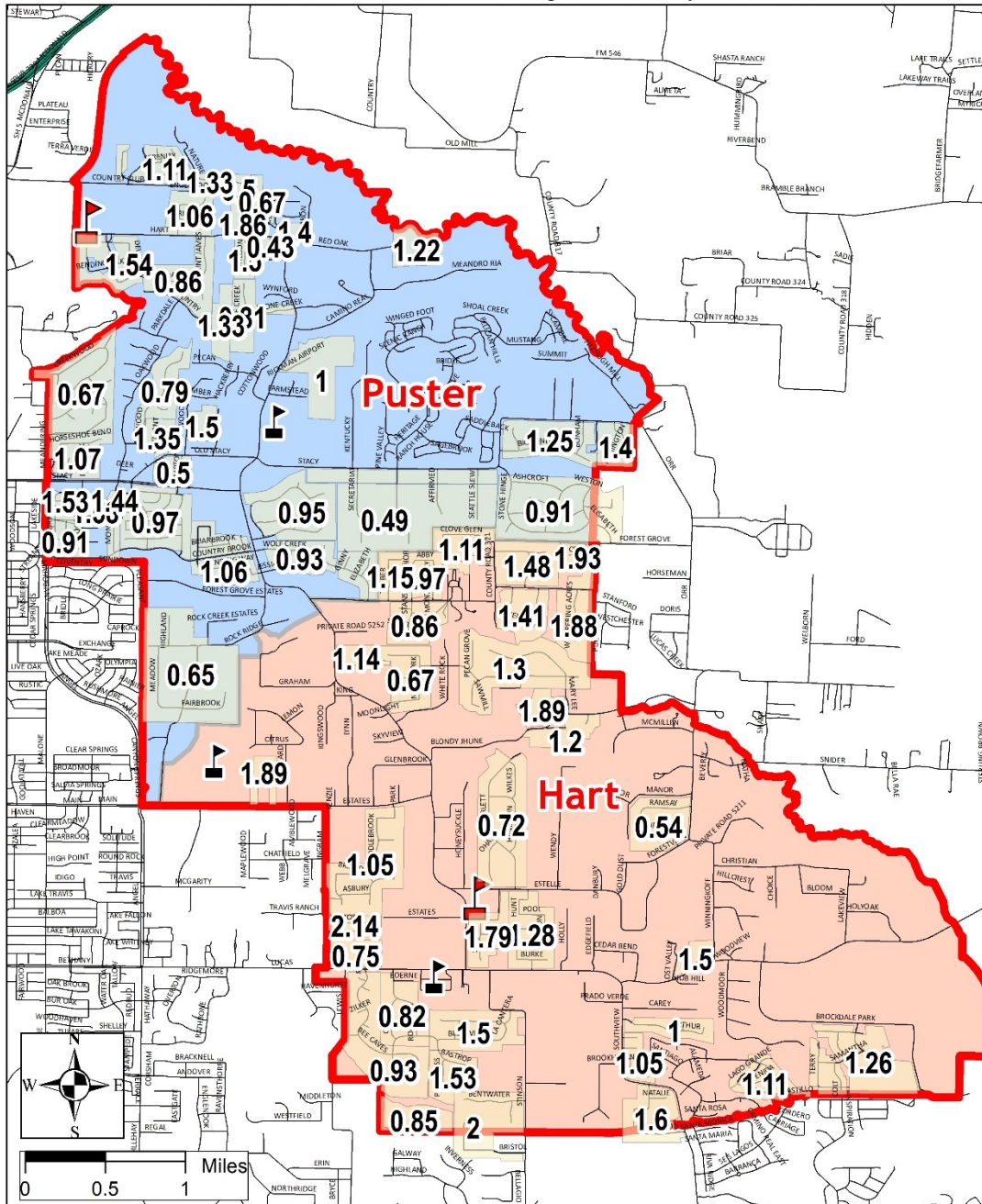
Lovejoy Independent School District  
Overall Enrollment Change Fall 2020-Fall 2021



# Lovejoy Independent School District 5-Year Overall Enrollment Change Fall 2016-Fall 2021



# Lovejoy Independent School District Student Yields Per Single-Family Home



# LOVEJOY ISD STUDENTS YIELDS 2021/22



Subdivision Name	Occupied Homes	Total Students	Students Per HH	City	Elem Students	Intermediate Students	Middle School Students	High School Students	Elem Per HH	IS Per HH	MS Per HH	HS Per HH
Belmont	32	49	1.53	Allen	14	9	11	15	0.44	0.28	0.34	0.47
Country Brook Estates	139	148	1.06	Allen	49	20	22	57	0.35	0.14	0.16	0.41
Stacy Estates	31	49	1.58	Allen	15	9	7	18	0.48	0.29	0.23	0.58
Stacy Ridge Estates	275	267	0.97	Allen	65	27	49	126	0.24	0.10	0.18	0.46
Steeplechase	18	26	1.44	Allen	8	3	2	13	0.44	0.17	0.11	0.72
Bellegrove	118	107	0.91	Allen	31	15	18	43	0.26	0.13	0.15	0.36
Commons Of Camden	62	65	1.05	Collin Co.	11	10	13	31	0.18	0.16	0.21	0.50
Green Meadow Estates	54	35	0.65	Collin Co.	12	10	4	9	0.22	0.19	0.07	0.17
Bridlegate	40	43	1.08	Fairview	11	6	6	20	0.28	0.15	0.15	0.50
Fairview Farms	79	39	0.49	Fairview	12	3	6	18	0.15	0.04	0.08	0.23
Fairview Meadows	35	37	1.06	Fairview	9	6	8	14	0.26	0.17	0.23	0.40
Fairview Ranch Estates	14	6	0.43	Fairview	1	0	1	4	0.07	0.00	0.07	0.29
Harbour Oaks Estates	7	13	1.86	Fairview	6	3	3	1	0.86	0.43	0.43	0.14
Harper Landing	4	4	1.00	Fairview	1	1	0	2	0.25	0.25	0.00	0.50
Kingdom Estates	3	4	1.33	Fairview	2	0	1	1	0.67	0.00	0.33	0.33
Oak Meadows	9	11	1.22	Fairview	1	2	3	5	0.11	0.22	0.33	0.56
Oaks of Fairview	17	23	1.35	Fairview	7	5	2	9	0.41	0.29	0.12	0.53
Oakwood Estates	148	128	0.86	Fairview	27	23	27	51	0.18	0.16	0.18	0.34
Parkside at Fairview	60	75	1.25	Fairview	29	12	19	15	0.48	0.20	0.32	0.25
Red Oak Ranch	5	7	1.40	Fairview	1	1	3	2	0.20	0.20	0.60	0.40
Remington Park	15	21	1.40	Fairview	6	3	4	8	0.40	0.20	0.27	0.53
River Oaks	102	68	0.67	Fairview	21	7	13	27	0.21	0.07	0.13	0.26
Stone Creek Estates	27	22	0.81	Fairview	4	4	4	10	0.15	0.15	0.15	0.37
Summer Hill Farm	59	56	0.95	Fairview	12	11	12	21	0.20	0.19	0.20	0.36
Sycamore Place	42	33	0.79	Fairview	12	4	4	13	0.29	0.10	0.10	0.31
Thompson Springs	106	96	0.91	Fairview	33	17	11	35	0.31	0.16	0.10	0.33
Three Oaks	9	6	0.67	Fairview	2	1	1	2	0.22	0.11	0.11	0.22
Tranquility Farms	46	71	1.54	Fairview	20	10	14	27	0.43	0.22	0.30	0.59
Wellington Park Estates	18	9	0.50	Fairview	5	3	1	0	0.28	0.17	0.06	0.00
Willow Pointe Estates	18	27	1.50	Fairview	5	3	8	11	0.28	0.17	0.44	0.61
Woodland Farm Estates	2	3	1.50	Fairview	1	2	0	0	0.50	1.00	0.00	0.00
Woods Of Ascot Heath	12	6	0.50	Fairview	2	0	1	3	0.17	0.00	0.08	0.25

➤ *Single-family homes in the district typically yield an average of 1.16 students per home*

➤ *Note single-family homes (both existing and new construction) have yielded younger students*

# LOVEJOY ISD STUDENTS YIELDS 2021/22 CONT.



Subdivision Name	Occupied Homes	Total Students	Students Per HH	City	Elem Students	Intermediate Students	Middle School Students	High School Students	Elem Per HH	IS Per HH	MS Per HH	HS Per HH
Amherst Estates	31	30	0.97	Lucas	9	1	3	17	0.29	0.03	0.10	0.55
Barry Farms	7	8	1.14	Lucas	2	3	1	2	0.29	0.43	0.14	0.29
Belmont Park	19	29	1.53	Lucas	8	6	9	6	0.42	0.32	0.47	0.32
Bristol Park	17	34	2.00	Lucas	15	3	5	11	0.88	0.18	0.29	0.65
Broadmoor Estates	35	39	1.11	Lucas	7	9	8	15	0.20	0.26	0.23	0.43
Brockdale Estates	160	202	1.26	Lucas	60	29	41	72	0.38	0.18	0.26	0.45
Cimarron	33	59	1.79	Lucas	9	9	14	27	0.27	0.27	0.42	0.82
Creeks of Forest Grove, The	14	12	0.86	Lucas	7	1	0	4	0.50	0.07	0.00	0.29
Creekside Estates	27	38	1.41	Lucas	15	8	4	11	0.56	0.30	0.15	0.41
Edgewood Estates	53	68	1.28	Lucas	21	13	13	21	0.40	0.25	0.25	0.40
Enclave, The	23	34	1.48	Lucas	13	2	7	12	0.57	0.09	0.30	0.52
Estates at Austin Trail	61	57	0.93	Lucas	12	14	4	27	0.20	0.23	0.07	0.44
Estates at Forest Grove	8	15	1.88	Lucas	4	3	3	5	0.50	0.38	0.38	0.63
Estates of Camden	24	24	1.00	Lucas	2	3	5	14	0.08	0.13	0.21	0.58
Farmstead, The	2	0	0.00	Lucas	0	0	0	0	0.00	0.00	0.00	0.00
Forest Creek Estates	37	48	1.30	Lucas	16	9	4	19	0.43	0.24	0.11	0.51
Huntwick Addition	28	15	0.54	Lucas	3	0	5	7	0.11	0.00	0.18	0.25
Konrad Ranch Estates	7	15	2.14	Lucas	6	2	3	4	0.86	0.29	0.43	0.57
Lewis Park Estates	15	24	1.60	Lucas	10	5	3	6	0.67	0.33	0.20	0.40
Northfork Ranch	27	18	0.67	Lucas	2	5	5	6	0.07	0.19	0.19	0.22
Ranch at Pecan Grove	15	29	1.93	Lucas	8	4	6	11	0.53	0.27	0.40	0.73
Reserve at Forest Creek/Gro	20	23	1.15	Lucas	7	6	7	3	0.35	0.30	0.35	0.15
Rimrock Estates	9	17	1.89	Lucas	6	3	2	6	0.67	0.33	0.22	0.67
Rockland Farms	38	31	0.82	Lucas	10	4	7	10	0.26	0.11	0.18	0.26
Rockland Farms	34	51	1.50	Lucas	19	5	9	18	0.56	0.15	0.26	0.53
Saddlebrook Estates	66	69	1.05	Lucas	19	13	16	21	0.29	0.20	0.24	0.32
Seis Lagos	56	62	1.11	Lucas	16	3	15	28	0.29	0.05	0.27	0.50
Stinson Highlands	13	11	0.85	Lucas	5	1	1	4	0.38	0.08	0.08	0.31
Tara	61	44	0.72	Lucas	14	7	11	12	0.23	0.11	0.18	0.20
Tokalaun Equestrian	9	17	1.89	Lucas	4	5	5	3	0.44	0.56	0.56	0.33
Tokalaun Park and Estuary	10	12	1.20	Lucas	4	1	2	5	0.40	0.10	0.20	0.50
Trailside	16	12	0.75	Lucas	2	2	1	7	0.13	0.13	0.06	0.44
Winding Creek Reserve	4	6	1.50	Lucas	2	1	1	2	0.50	0.25	0.25	0.50
Wolf Creek	59	55	0.93	Lucas	15	7	10	23	0.25	0.12	0.17	0.39
Nature Place	12	16	1.33	McKinney	8	3	3	2	0.67	0.25	0.25	0.17
Serenity	73	81	1.11	McKinney	26	12	18	25	0.36	0.16	0.25	0.34
									Average			
Totals	2,729	2,859			821	432	529	1,077	0.35	0.20	0.21	0.40
	Average	1.16										

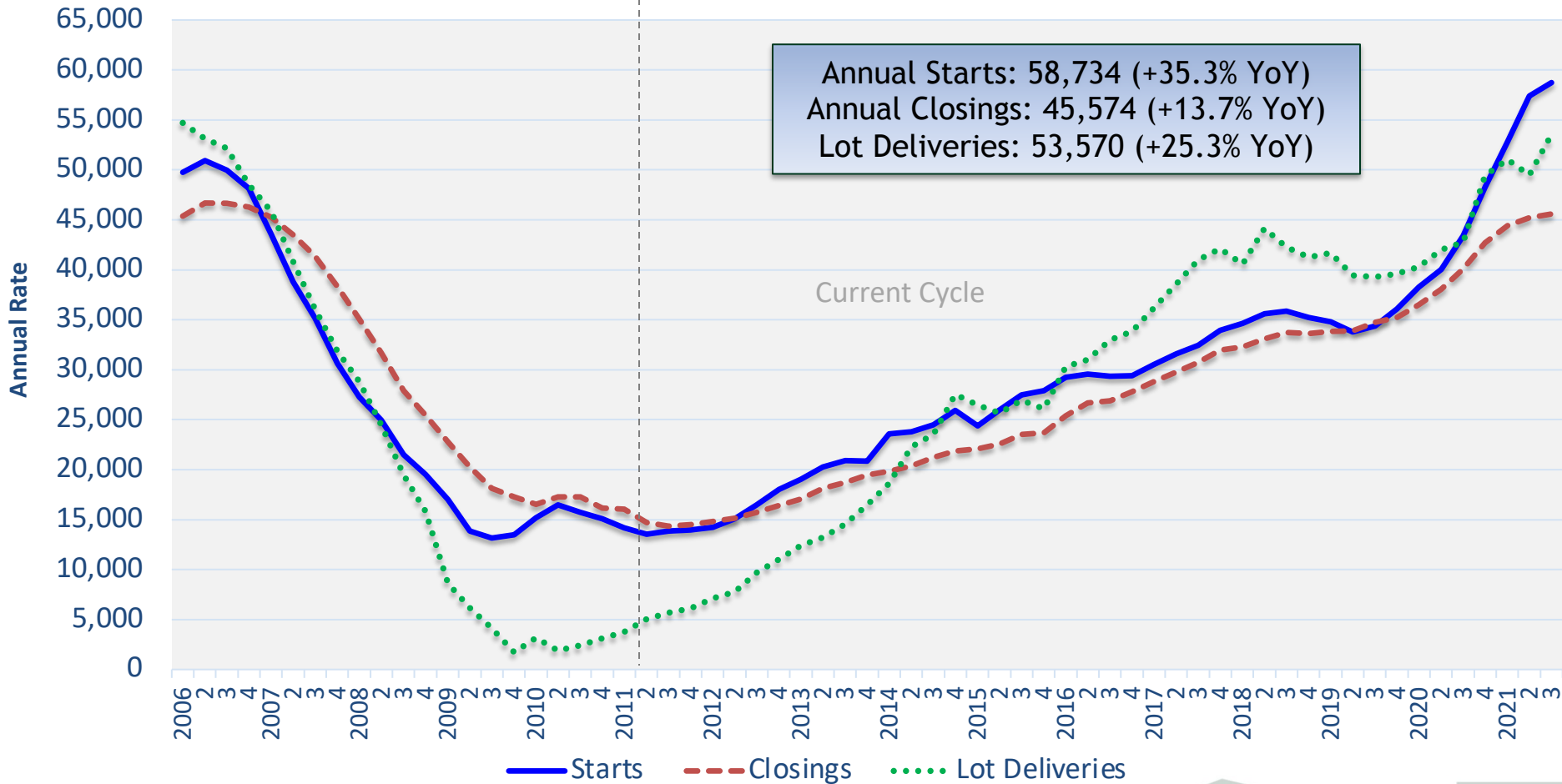
➤ Subdivisions with active new home construction have yielded an average of 1.32 students per home

Neighboring District Overall Student Yield Comparison:

Allen ISD = 0.64

Wylie ISD = 0.78

# DFW: NEW HOME STARTS, CLOSINGS & LOT DELIVERIES



➤ DFW new home activity climbs to record highs in the 3<sup>rd</sup> quarter of 2021

# DFW HOUSING MARKET—WORKING THROUGH THE BACKLOG

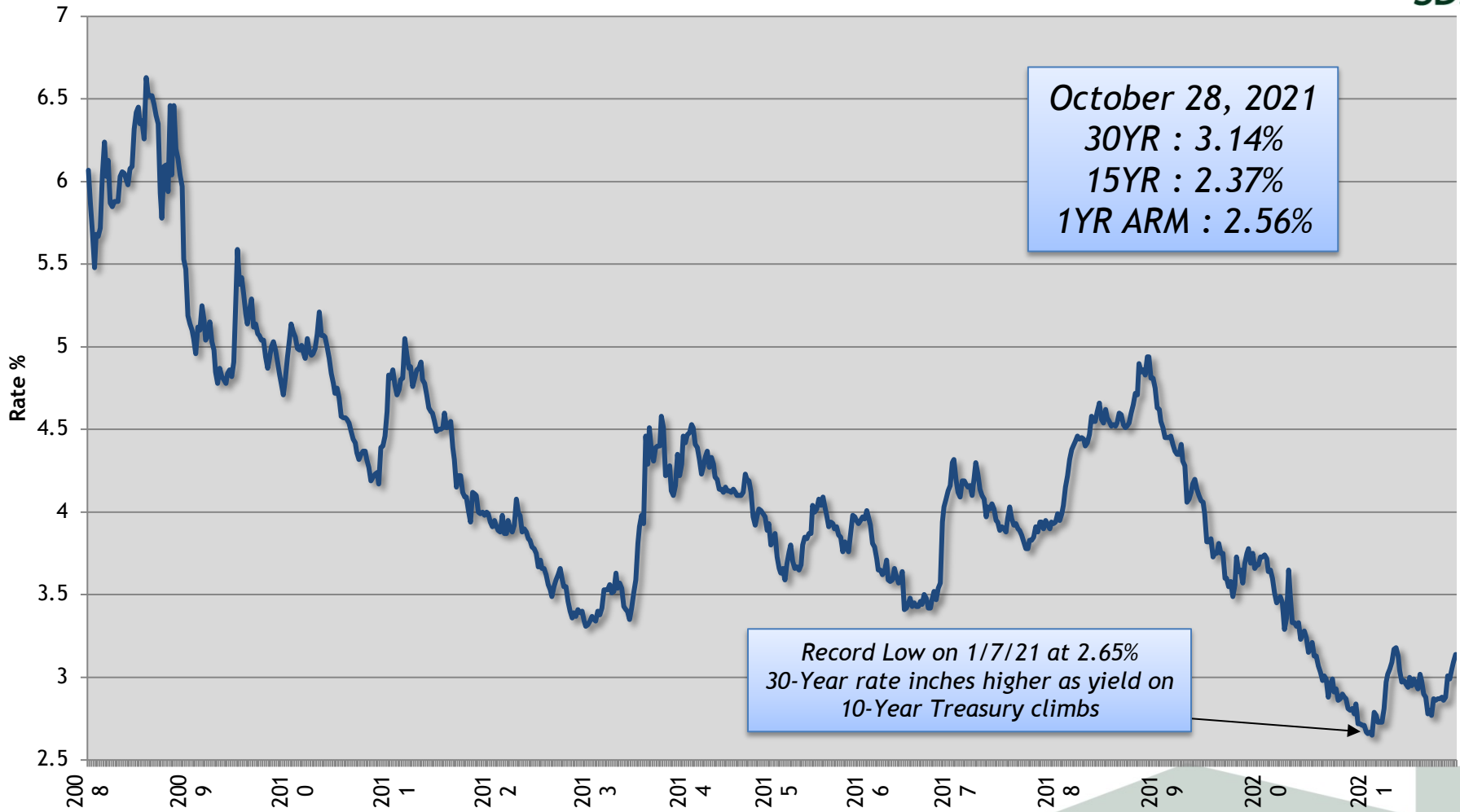
## *Combined Factors Produces Wave of Buyer Demand in 2021*

- From 1Q10 thru 1Q20, about 1 million net jobs created in DFW, but only 267K home starts
  - Recall that historical ratio closer to 2:1
  - During 2017-2019, many would-be buyers are limited from purchasing a home because of affordability
- Drop in mortgage rates unlocks pent up demand for renters
- Leading edge Millennials become First-time buyers
- Existing home market stripped of inventory
- Relos keep coming during pandemic

## *Buyer Demand Outpaces Construction Capacity*

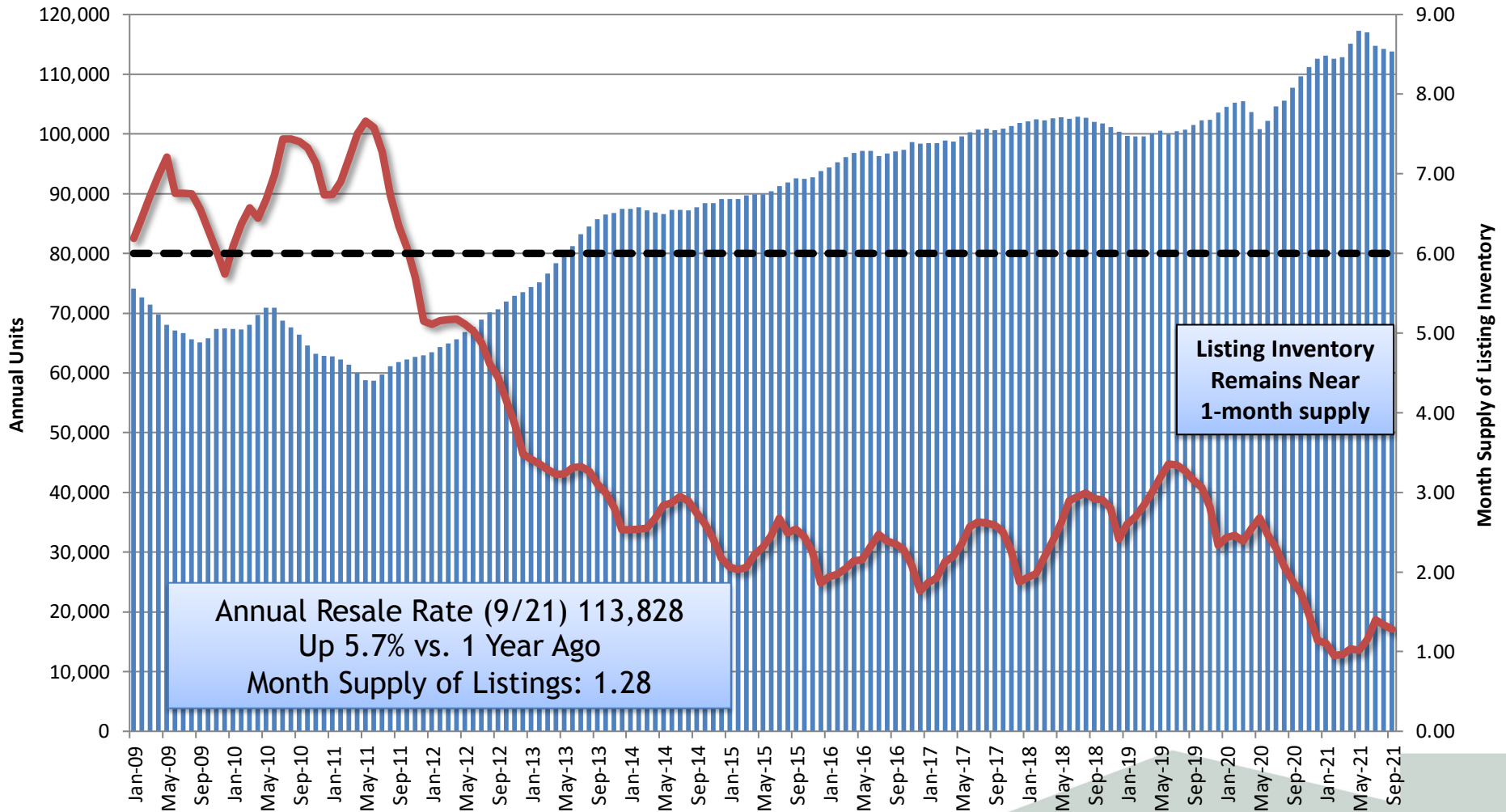
- By 3Q21, YoY annual rate up 35% to 58,734 starts
- But Construction Capacity at 45K units (closings)—limited number of workers, constrained supply chain can't keep pace with demand
- WIP surges 77% YoY, construction cycle times mushroom
- Builders raise prices: Entry-level houses up at least \$50K YoY, move-up houses by as much as \$150K

# 30-YEAR MORTGAGE RATE



Source: Freddie Mac

# DFW EXISTING HOME SALES (DFW MSA)



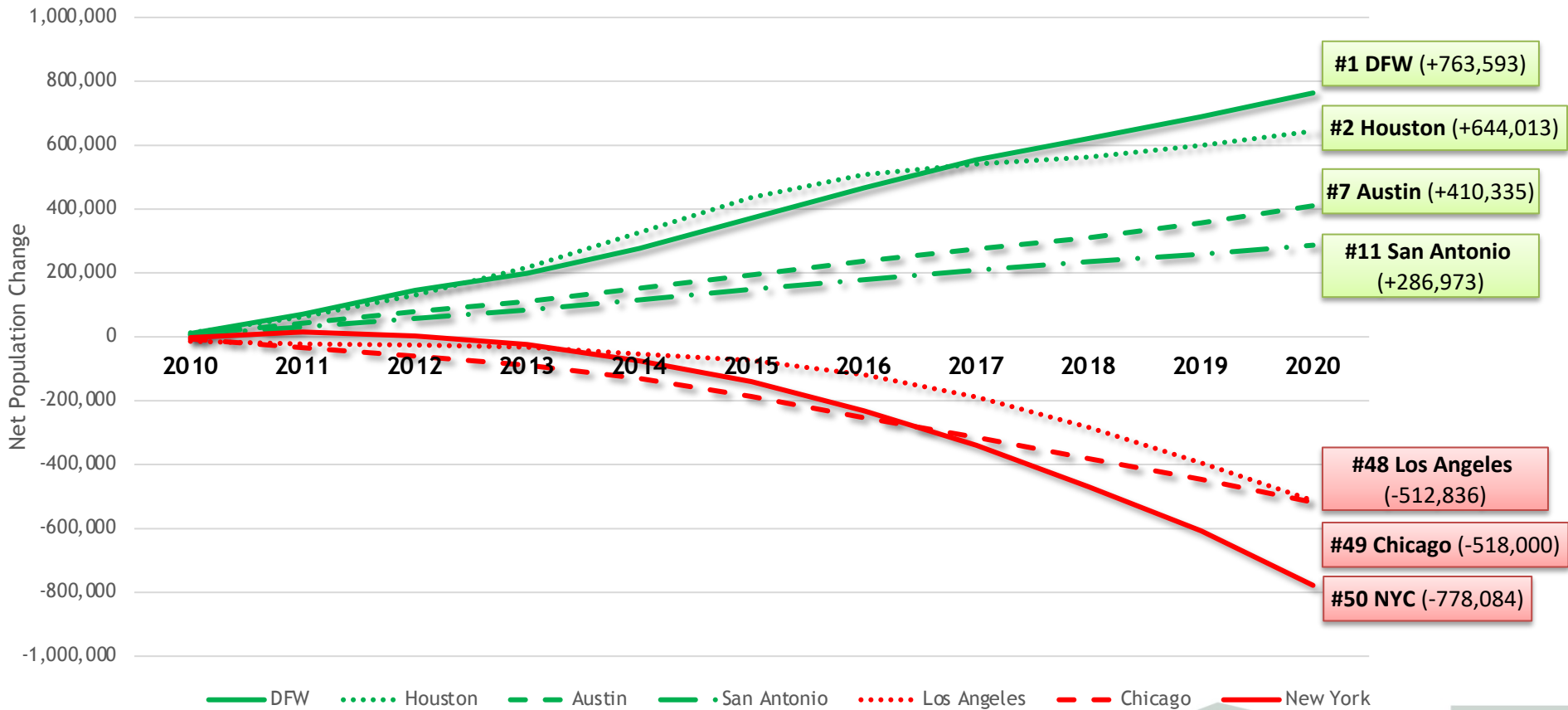
Source: Texas A&M Real Estate Center

Note that Texas A&M has redefined MLS Area to MSA instead of previous area compilations

# MIGRATION—COMPARISON OF TOP 50 U.S. MSAs



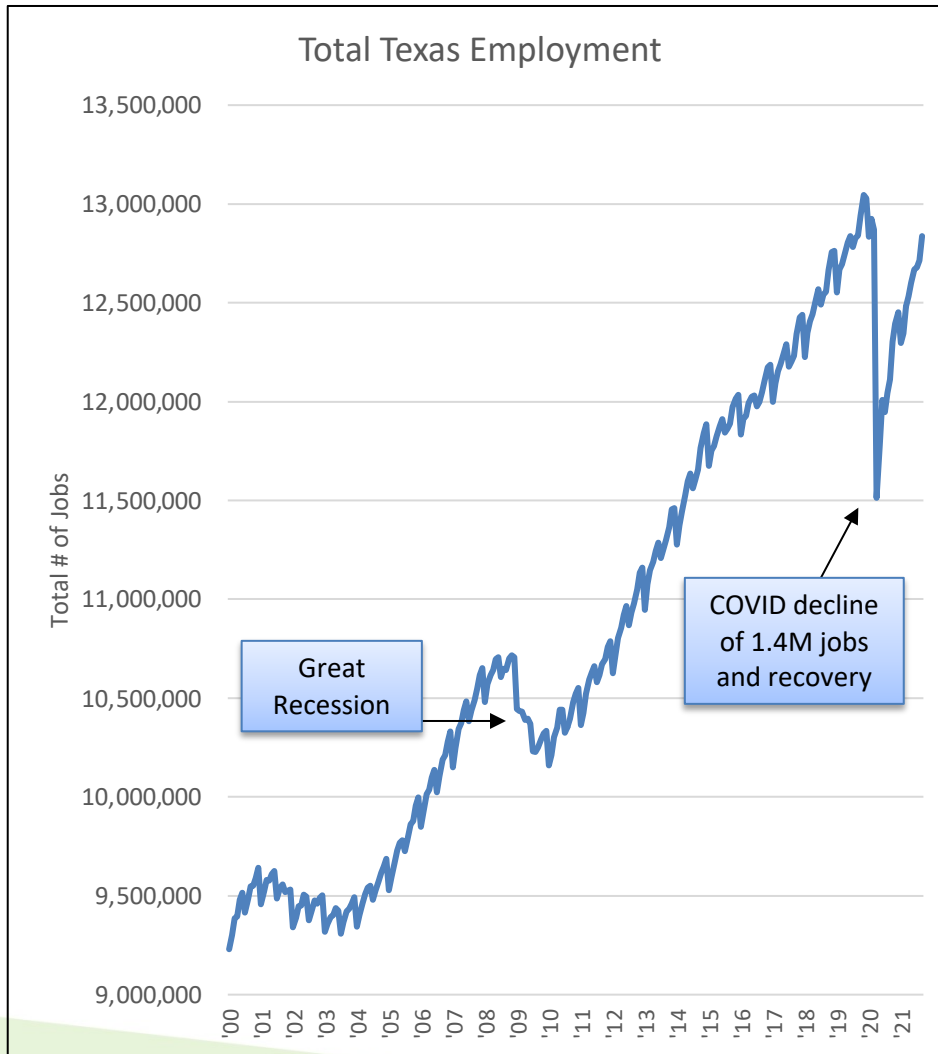
Cumulative Migration 2010-2020



Analysis reviews net migration patterns in the top 50 most populated US MSAs for 2010-2020

Source: US Census Bureau

# TEXAS ECONOMY



## Tracking the Employment Recovery

**Difference From Pre-Pandemic Level of 2/20 and 9/21**

***United States***

– -3.286 million      -2.18%

***Texas***

– -90,200      -0.70%

***Major Texas Markets (Sept 2021) Gap From Pre-Pandemic High***

– **DFW**      -2,400      -0.06%

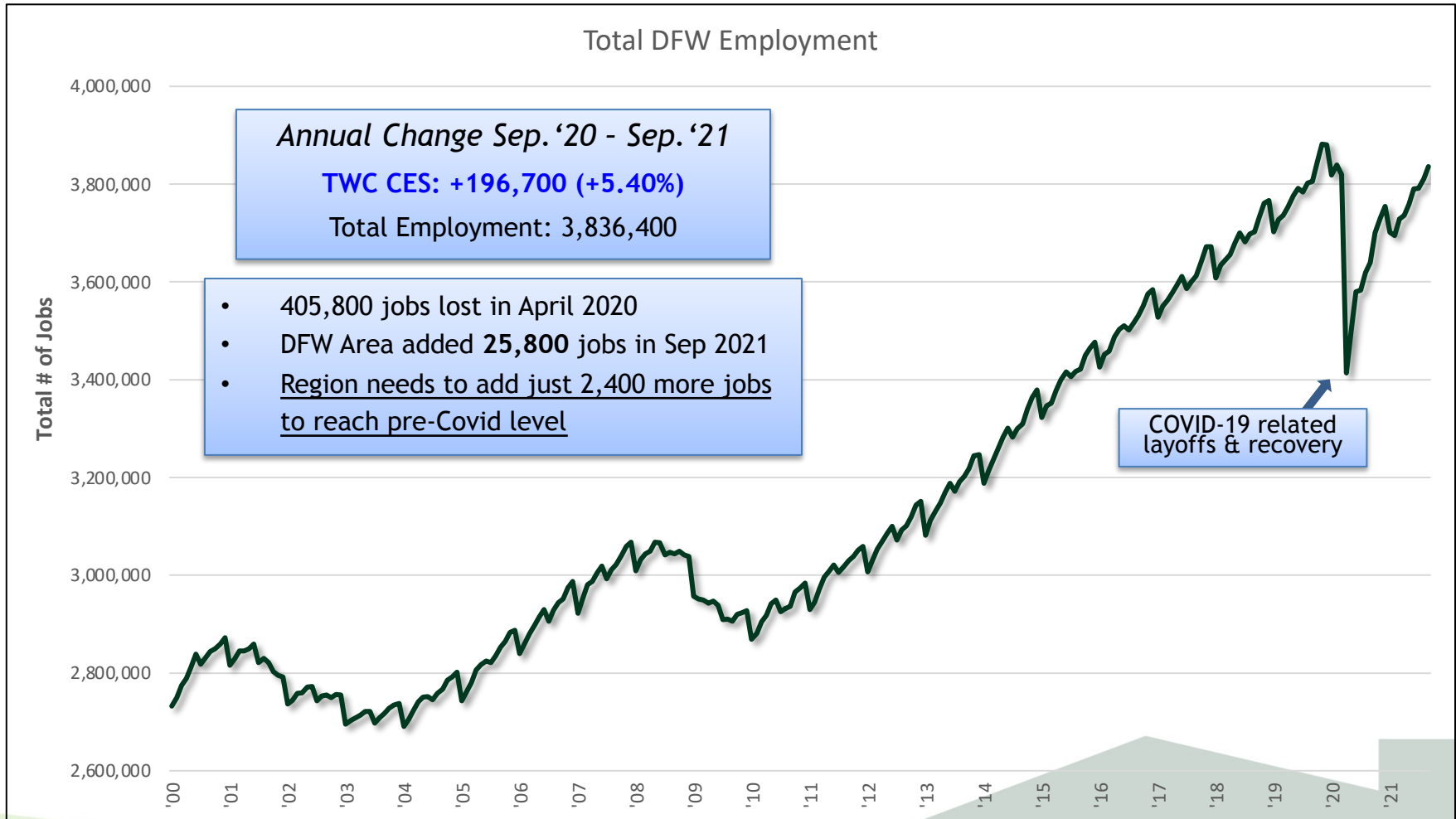
– Houston      -115,800      -3.63%

– Austin      +16,700      +1.46%

– San Antonio      -3,800      -0.35%

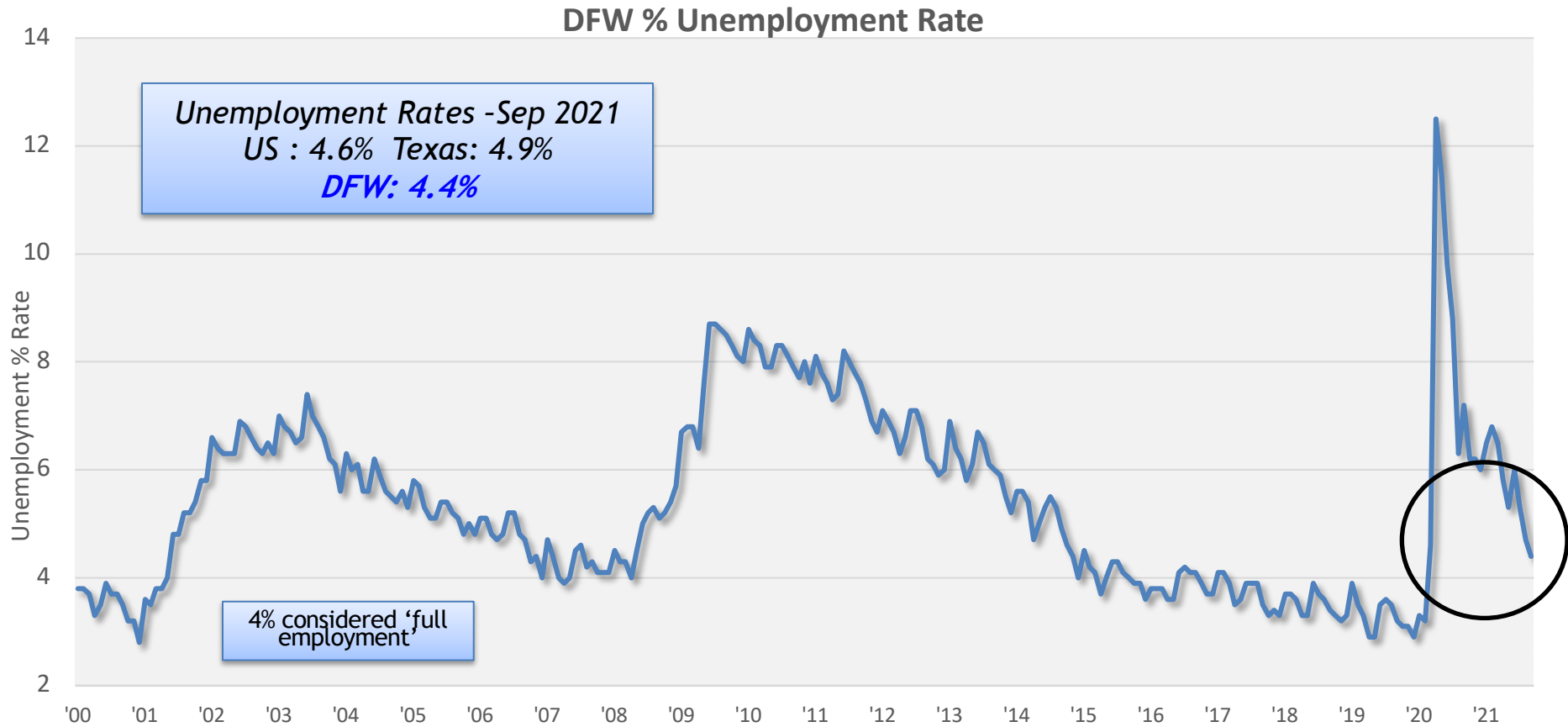
Source: TWC - CES (Not Seasonally Adjusted)

# DFW EMPLOYMENT RECOVERY



Sources: TWC - CES, Dallas Federal Reserve (Not Seasonally Adjusted)

# DFW UNEMPLOYMENT



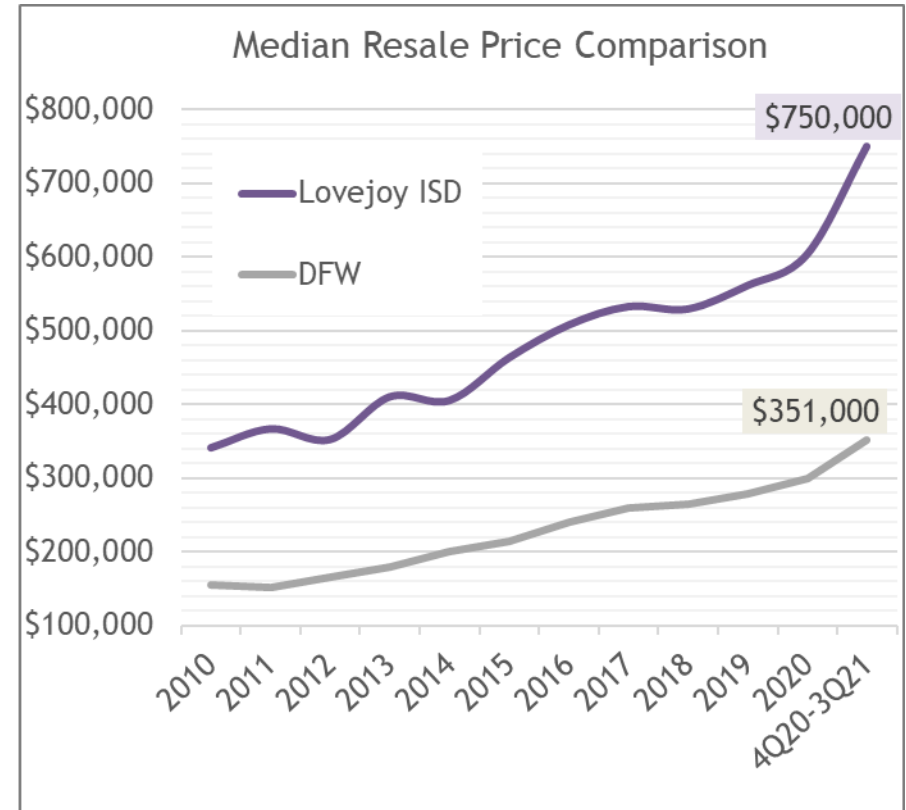
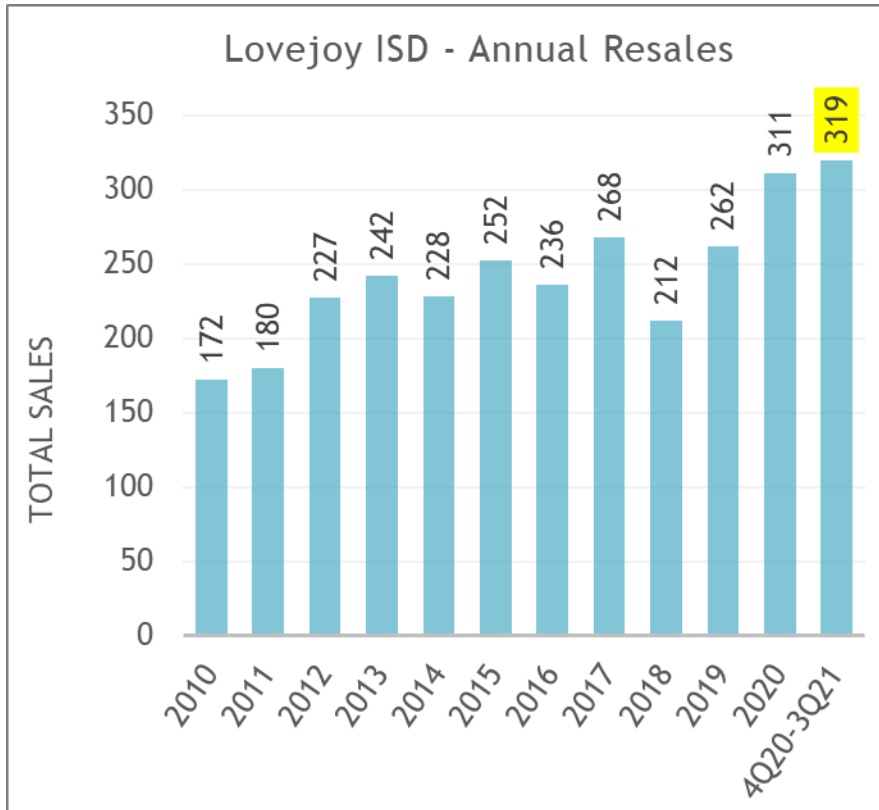
Not Seasonally Adjusted

Source: TWC - LAUS



# LOVEJOY ISD ISD PRE-OWNED HOME MARKET

Source: SABOR  
SF Sales Only,  
Texas A&M Real  
Estate Center

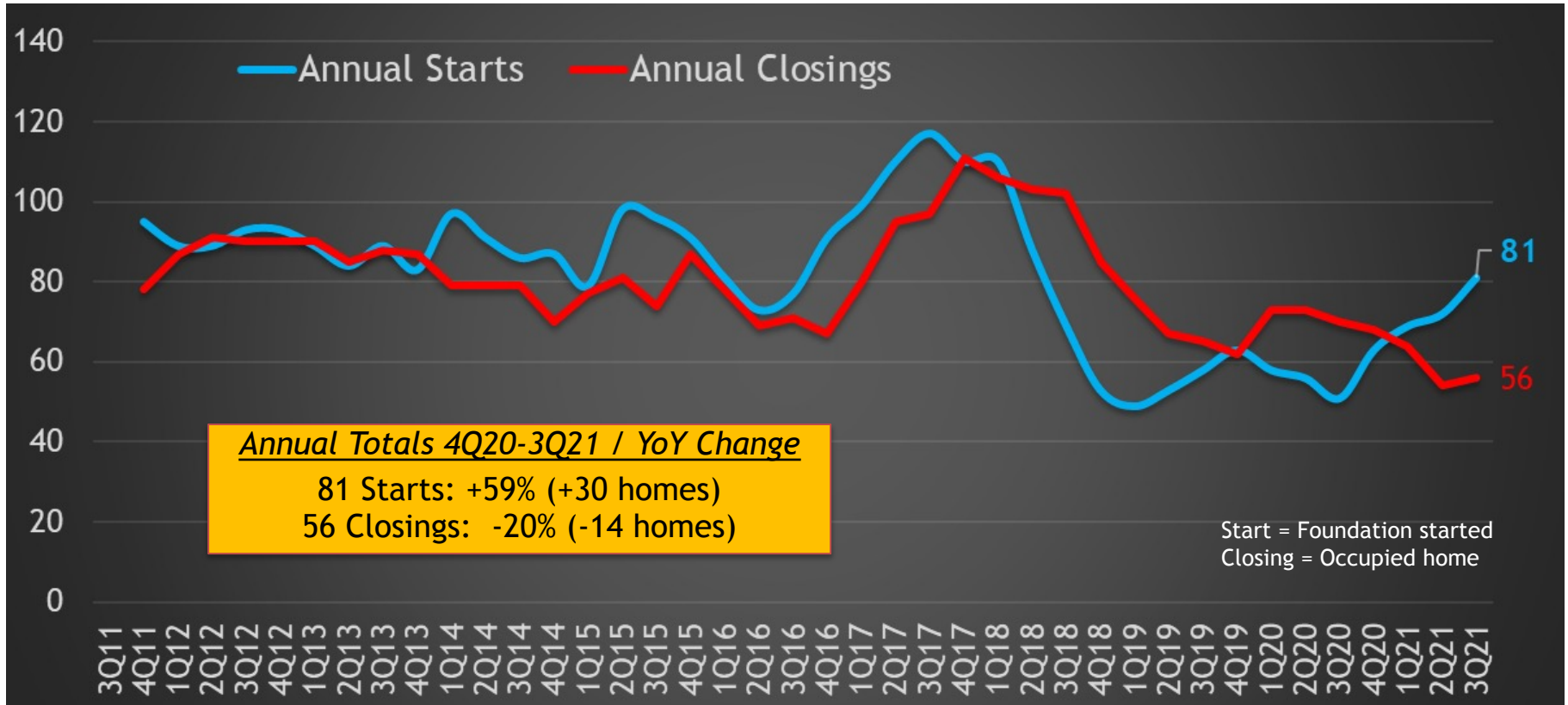


- 319 total resales in the district from 4Q20-3Q21 (+12.3% YoY)
- District's average resale sold price over the past year was a record \$750,000 (+31% YoY)



# LOVEJOY ISD

## ANNUAL NEW HOME CONSTRUCTION



- New homebuilders produced 81 starts in the district from 4Q20-3Q21 (+59% YoY)
  - 3-year high
- Annual closings fell 20% over the past year to 56 homes
- No new lots delivered over the past 12 months

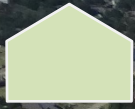


# LOVEJOY ISD TOP PRODUCING NEW HOME SUBDIVISIONS 4Q20-3Q21 (ranked by closings)



Rank	Subdivision	Annual Starts	Annual Closings	Elementary Zone
1	BROCKDALE ESTATES	38	28	HART
2	STINSON HIGHLANDS	8	4	HART
3	LEWIS PARK	10	3	HART
4	HARBOUR OAKS ESTATES	2	3	PUSTER
5	RIMROCK ESTATES	1	3	HART
6	HARPER LANDING	3	2	PUSTER
7	THE FARMSTEAD	3	2	HART
8	BRISTOL PARK	0	2	HART
9	WOODLAND FARM ESTATES	4	1	PUSTER
10	FAIRVIEW FARMS	1	1	PUSTER
11	BARRY FARMS	1	1	HART





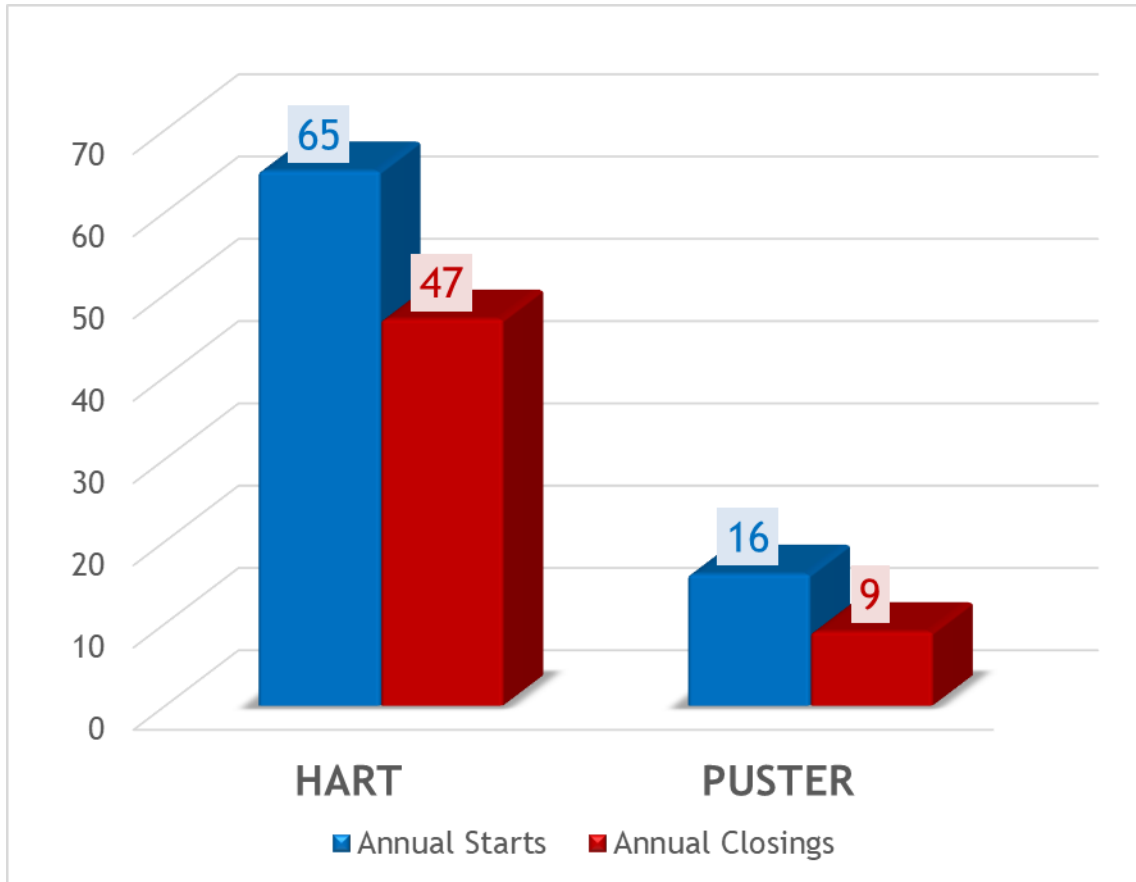
# BROCKDALE ESTATES



➤ *First 160 occupied homes in Brockdale have yielded 202 total LISD students (1.26 students per home)*



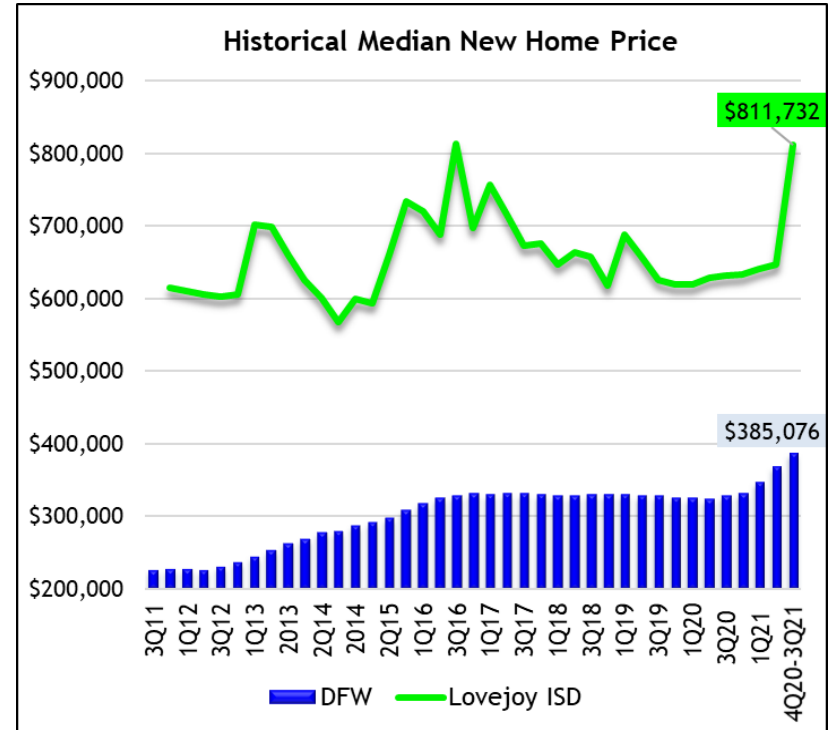
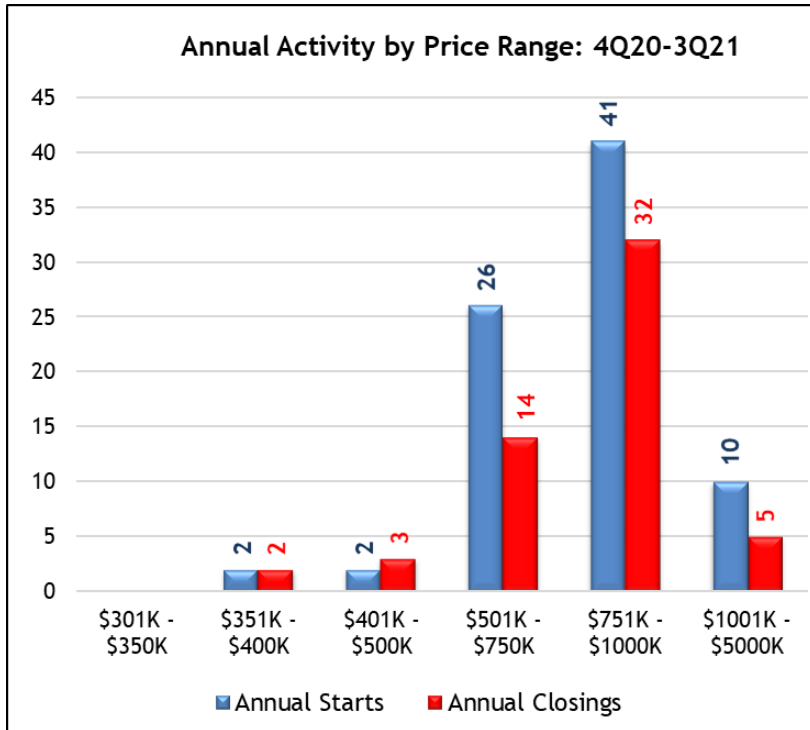
# NEW HOME ACTIVITY BY ELEMENTARY ZONE: 4Q20-3Q21



➤ 80-85% of the district's new home construction is currently in the Hart Elementary attendance zone



# DISTRICT MEDIAN NEW HOME PRICE

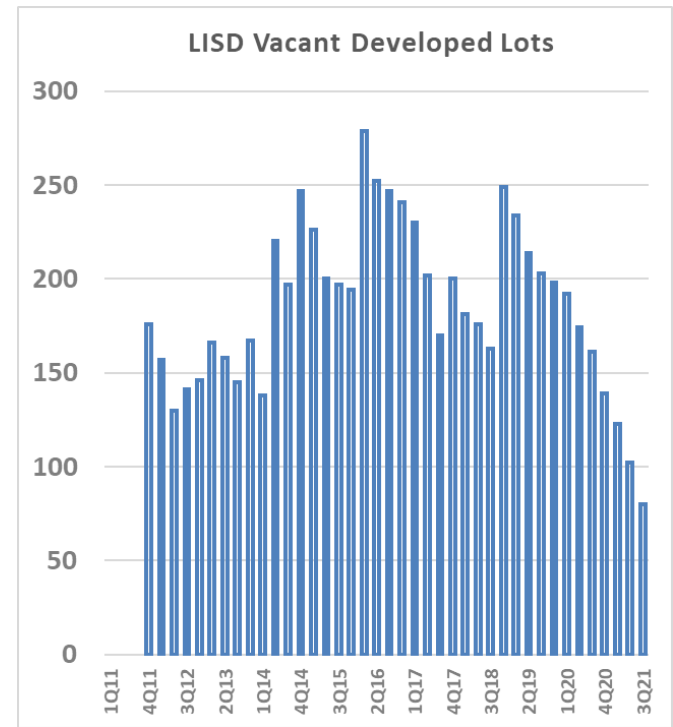


- Most new homes in Lovejoy ISD are priced over \$750K today
- The district's median new home price as of September 2021 was a record \$811,732 (+28.4% YoY)

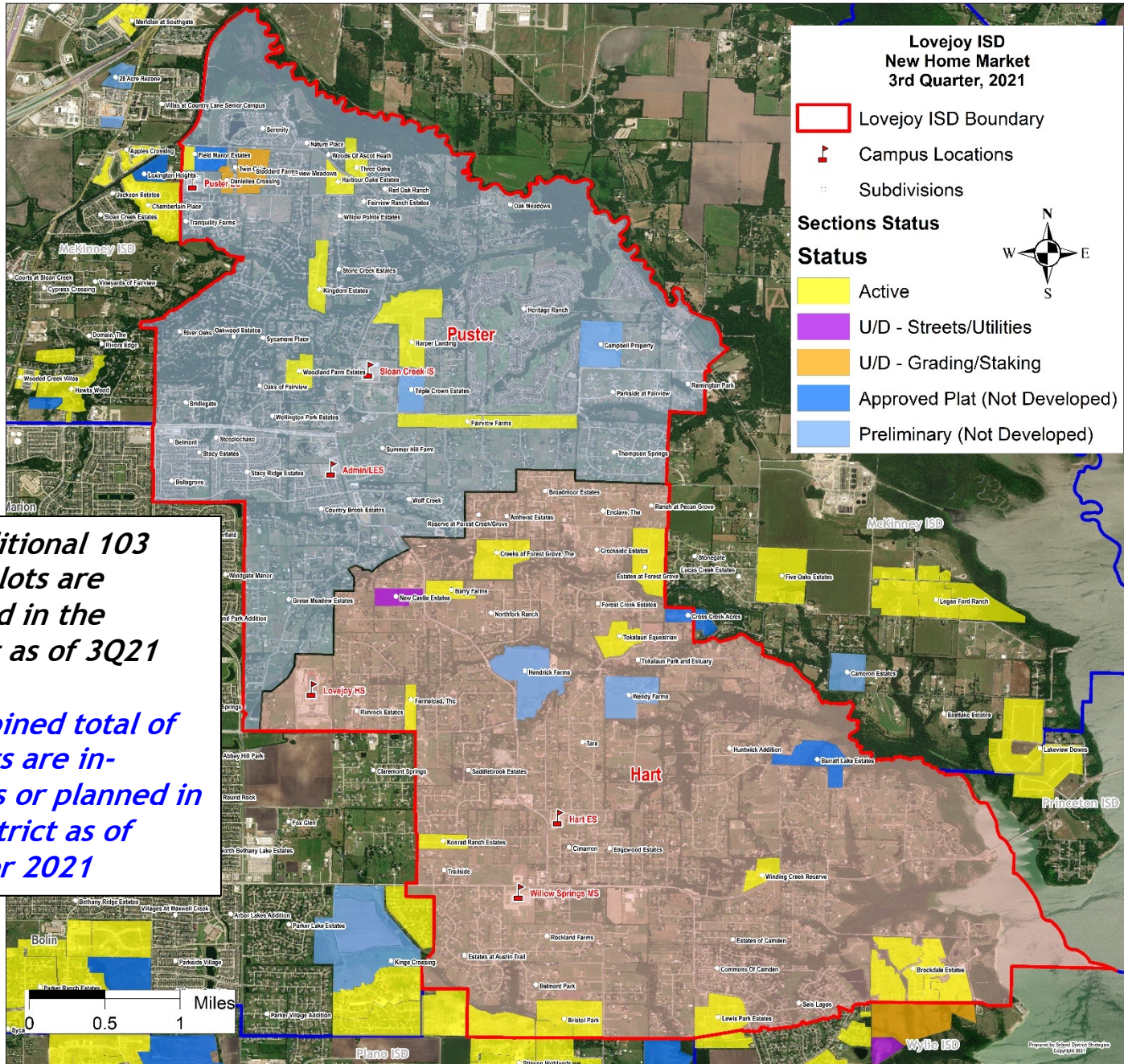


# LOVEJOY ISD NEW HOME LOT INVENTORY

- 73 homes in-process (under construction, finished vacant, or models)
- 80 vacant developed lots remaining as of 9/30/2021  
*(Lowest total in more than 10 years)*
- 28 future lots under development



Subdivision	Section (s)	Lot Width (s)	Lots Under Development	Elementary Zone	City Sector
Danielles Crossing	1	350x200	6	Puster	Fairview
Stoddard Farms	1	200x400	14	Puster	Fairview
New Castle Estates	1	300x280	8	Hart	Lucas
<b>Total Lots</b>			<b>28</b>		



**Lovejoy ISD  
New Home Market  
3rd Quarter, 2021**

- Lovejoy ISD Boundary
- 📍 Campus Locations
- ⦿ Subdivisions

**Sections Status**

**Status**

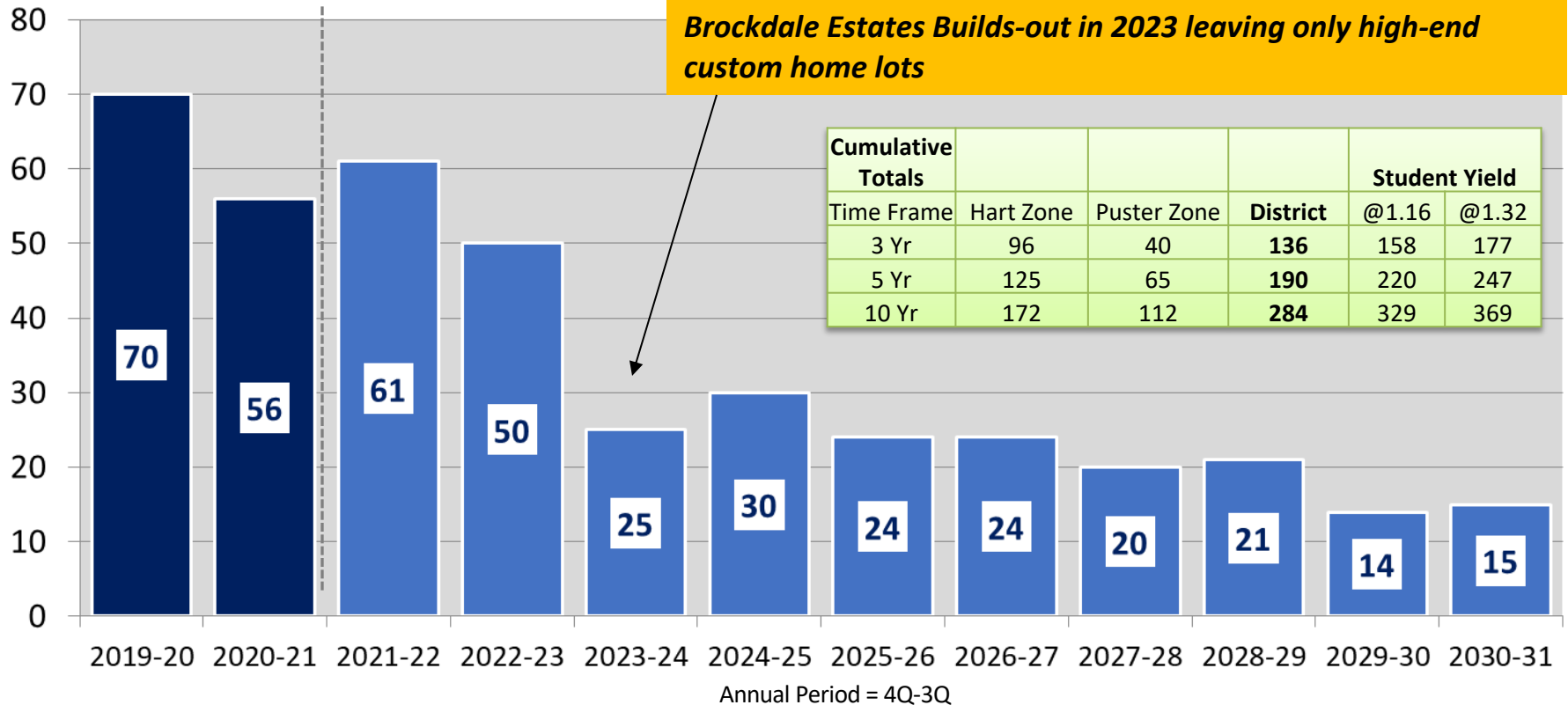
- Active
- U/D - Streets/Utilities
- U/D - Grading/Staking
- Approved Plat (Not Developed)
- Preliminary (Not Developed)

- *An additional 103 future lots are planned in the district as of 3Q21*
- *A combined total of 284 lots are in-process or planned in the district as of October 2021*



# DISTRICT NEW HOME OCCUPANCY FORECAST

(Moderate Scenario - Based on known projects as of Fall 2021)

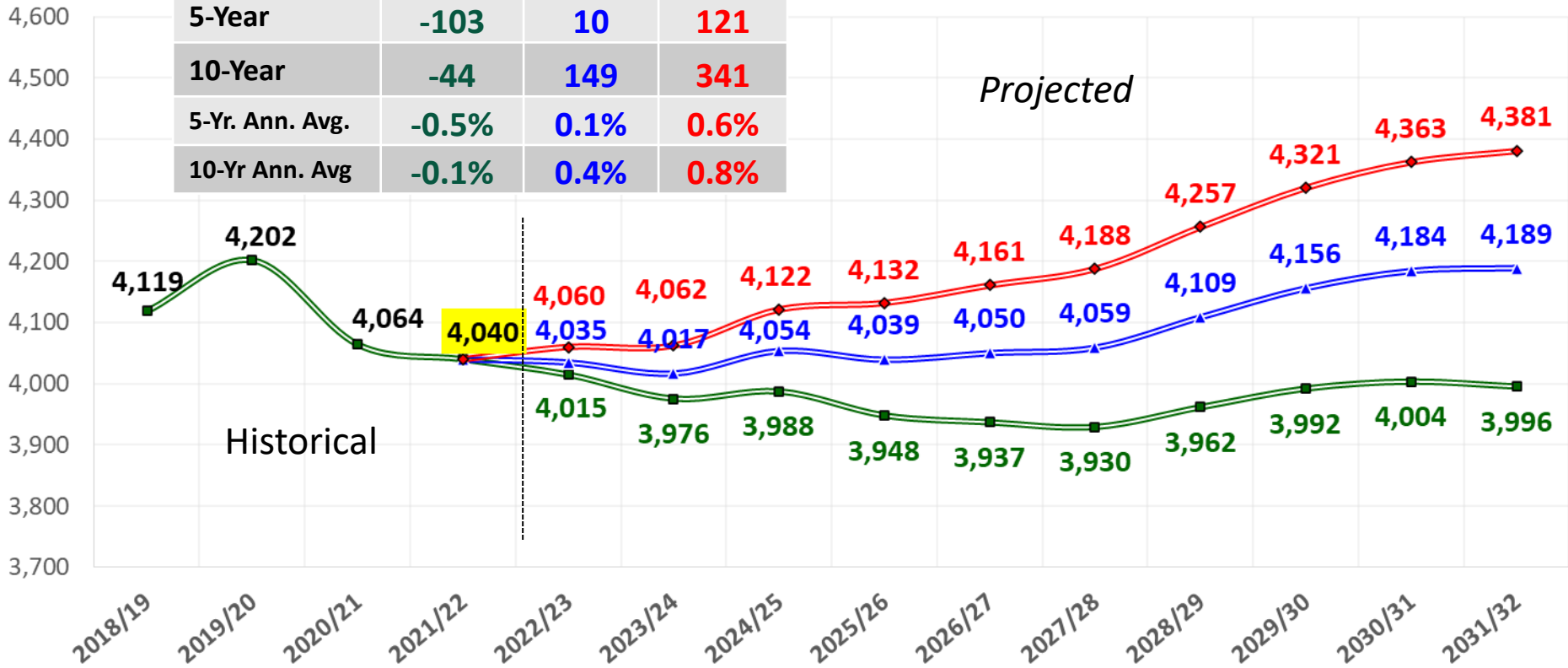


- About 190 total new home closings projected in the district over the next five years
- LISD could see about 285 new homes occupied over the next 10 years
- Remaining residential lots could add another 330-370 students within the district boundary over the next decade



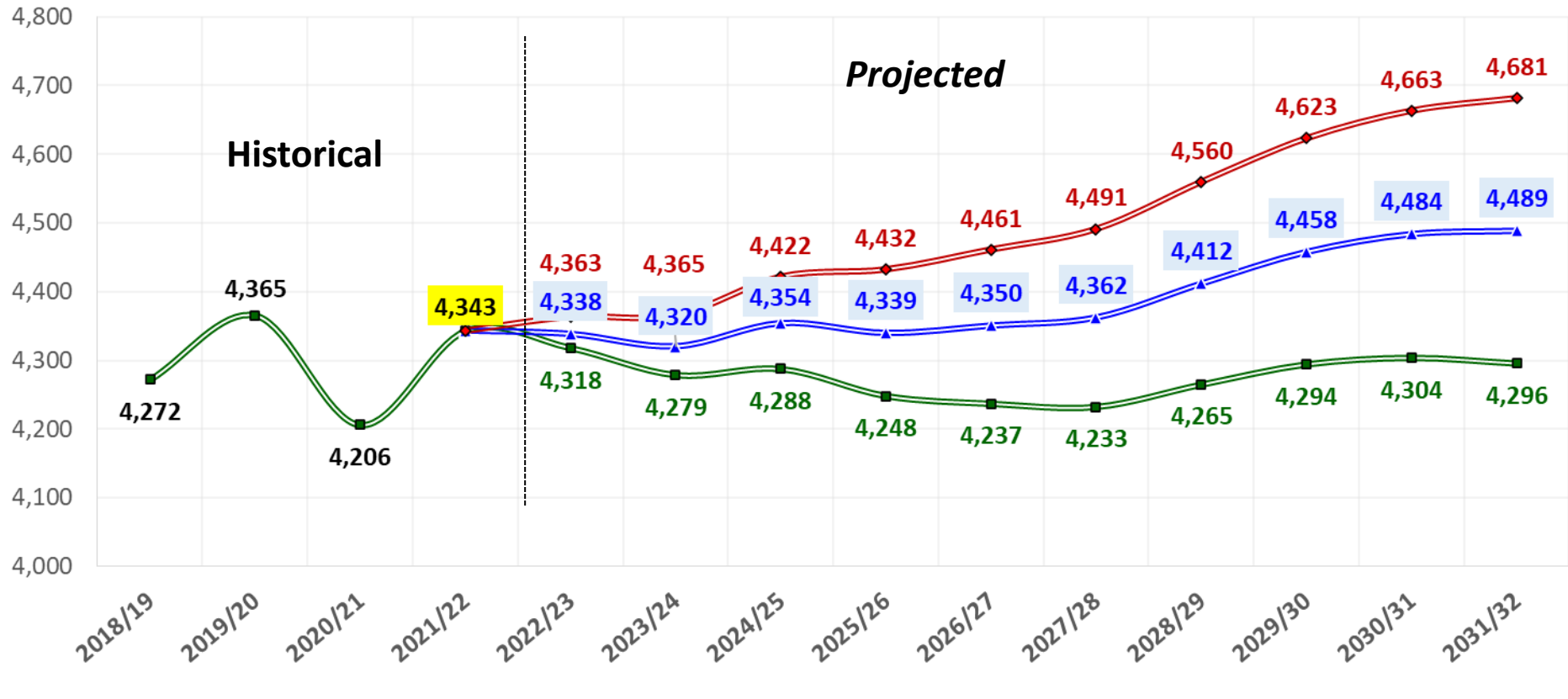
# DISTRICT ENROLLMENT PROJECTIONS RESIDENT STUDENTS ONLY

Projected Net Growth	Low Scenario	Moderate Scenario	High Scenario
3-Year	-52	14	82
5-Year	-103	10	121
10-Year	-44	149	341
5-Yr. Ann. Avg.	-0.5%	0.1%	0.6%
10-Yr Ann. Avg	-0.1%	0.4%	0.8%



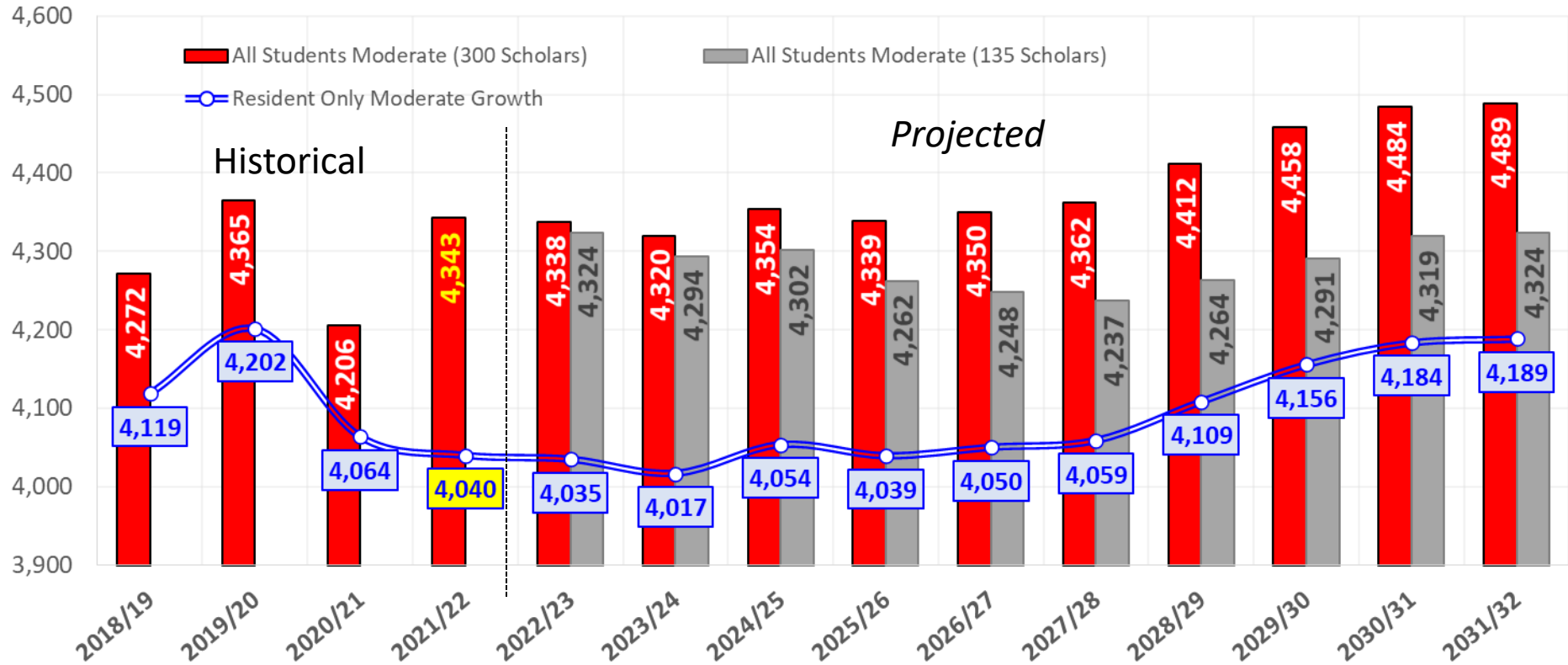


# DISTRICT ENROLLMENT PROJECTIONS RESIDENTS AND LOVEJOY SCHOLARS AT 300 STUDENTS





# DISTRICT ENROLLMENT PROJECTIONS MODERATE GROWTH SCENARIO SUMMARY



**Red Bars:** Projections assume that LISD will maintain approximately 300 non-resident transfers into the district

**Grey Bars:** Projections assume that the number of non-resident transfers is gradually reduced to 135 students



# CAMPUS PROJECTIONS VS. CAPACITY



*Moderate Scenario (w/ 300 Scholars)*

Lovejoy ISD	Historical	Projected Fall Enrollment									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32
<b>Hart Elementary</b>			<i>Functional Capacity = 675</i>			<i>Design Capacity = 805</i>					
Total Enrollment (PK-4)	586	607	595	632	632	618	633	639	647	659	667
Functional Capacity Utilization	87%	90%	88%	94%	94%	91%	94%	95%	96%	98%	99%
Functional Space Remaining	89	68	80	43	43	57	42	36	28	16	8
Design Capacity Utilization	73%	75%	74%	79%	79%	77%	79%	79%	80%	82%	83%
Design Space Remaining	219	198	210	173	173	187	172	166	158	146	138
<b>Puster Elementary</b>			<i>Functional Capacity = 738</i>			<i>Design Capacity = 747</i>					
Total Enrollment (PK-4)	674	659	651	661	693	721	723	727	731	733	738
Functional Capacity Utilization	91%	89%	88%	90%	94%	98%	98%	99%	99%	99%	100%
Functional Space Remaining	64	79	87	77	45	17	15	11	7	5	0
Design Capacity Utilization	90%	88%	87%	88%	93%	97%	97%	97%	98%	98%	99%
Design Space Remaining	73	88	96	86	54	26	24	20	16	14	9
<b>Elementary Total</b>			<i>Elementary Functional Capacity = 1,413</i>			<i>Design Capacity = 1,552</i>					
Total Enrollment (PK-4)	1,260	1,266	1,246	1,293	1,325	1,339	1,356	1,366	1,378	1,392	1,405
Functional Capacity Utilization	89%	90%	88%	92%	94%	95%	96%	97%	98%	99%	99%
Functional Space Remaining	153	147	167	120	88	74	57	47	35	21	8
Design Capacity Utilization	81%	82%	80%	83%	85%	86%	87%	88%	89%	90%	91%
Design Space Remaining	292	286	306	259	227	213	196	186	174	160	147
<b>Sloan Creek Intermediate</b>			<i>Functional Capacity = 895</i>			<i>Design Capacity = 1,004</i>					
Total Enrollment (5-6)	656	670	698	667	627	662	683	693	705	712	719
Functional Capacity Utilization	73%	75%	78%	74%	70%	74%	76%	77%	79%	80%	80%
Functional Space Remaining	239	225	197	228	268	233	212	202	190	183	176
Design Capacity Utilization	65%	67%	70%	66%	62%	66%	68%	69%	70%	71%	72%
Design Space Remaining	348	334	306	337	377	342	321	311	299	292	285



# CAMPUS PROJECTIONS VS. CAPACITY (Moderate Scenario)

Lovejoy ISD	Historical	Projected Fall Enrollment										
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	
Willow Springs Middle School			Functional Capacity = 947				Design Capacity = 1,111					
Total Enrollment (7-8)	784	753	728	745	781	747	705	743	759	770	784	
Functional Capacity Utilization	83%	79%	77%	79%	82%	79%	74%	78%	80%	81%	83%	
Functional Space Remaining	163	194	219	202	166	200	242	204	188	177	163	
Design Capacity Utilization	71%	68%	66%	67%	70%	67%	64%	67%	68%	69%	71%	
Design Space Remaining	327	358	383	366	330	364	406	368	352	341	327	
<b>Lovejoy High School</b>			<b>Functional Capacity = 1,853</b>				<b>Design Capacity = 1,952</b>					
Total Enrollment (9-12)	1,643	1,650	1,648	1,649	1,606	1,602	1,618	1,610	1,616	1,610	1,581	
Functional Capacity Utilization	89%	89%	89%	89%	87%	86%	87%	87%	87%	87%	85%	
Functional Space Remaining	210	203	205	204	247	251	235	243	237	243	272	
Design Capacity Utilization	84%	85%	84%	84%	82%	82%	83%	83%	83%	82%	81%	
Design Space Remaining	309	302	304	303	346	350	334	342	336	342	371	
			<b>District Functional Capacity = 5,108</b>					<b>District Design Capacity = 5,619</b>				
District Total Enrollment (PK-12)	4,343	4,338	4,320	4,354	4,339	4,350	4,362	4,412	4,458	4,484	4,489	
Annual Growth	137	-5	-18	34	-14	11	12	50	46	26	5	
Year-Over-Year % Change	3.3%	-0.1%	-0.4%	0.8%	-0.3%	0.3%	0.3%	1.1%	1.1%	0.6%	0.1%	
Functional Capacity Utilization	85%	85%	85%	85%	85%	85%	85%	86%	87%	88%	88%	
Functional Space Remaining	765	770	788	754	769	758	746	696	650	624	619	
Design Capacity Utilization	77%	77%	77%	77%	77%	77%	78%	79%	79%	80%	80%	
Design Space Remaining	1,276	1,281	1,299	1,265	1,280	1,269	1,257	1,207	1,161	1,135	1,130	
				<b>3-Year</b>		<b>5-Year</b>					<b>10-Year</b>	
		<b>Cumulative Growth:</b>		<b>11</b>		<b>7</b>					<b>146</b>	
		<b>Average Annual Growth Rate:</b>		<b>0.1%</b>		<b>0.0%</b>					<b>0.3%</b>	
Enrollment at 100% of capacity												

# Lovejoy ISD

## 2021/22 Demographics Update Summary

- District enrollment as of the October snapshot date was 4,343 students (+3.3% or +137 students vs. 2020)
- 88% of enrolled students are students living with the district boundary (~3,800 students)
- In 2021/22, 532 enrolled students transfer into the district (43% employee students & 57% are Scholars)
- Lovejoy ISD's resident enrollment (students inside the boundary plus students of employees) is currently 4,040 students (-0.6% or -24 students vs. 2020/21)
- 38% of resident students are high school students (29% are Elem, 18% Middle, and 15% Intermediate)
- Over the past 5 years, resident student enrollment has been growing at an average of 0.4% per year
- Despite the COVID-19 environment lingering, new home construction across the Dallas-Ft. Worth area surged to record levels in 2021
- New homebuilders in LISD started 81 and closed 56 homes from 4Q20-3Q21 with the majority of the activity occurring at Brockdale Estates in Lucas
- As of October 2021, there were 73 new homes in-process and 80 vacant developed lots remaining
- 28 lots were under development with another 103 future lots planned
- Combined, the district has 284 single-family homes/lots in-process and/or planned, and all are expected to be developed and occupied by 2032
- Overall, single-family homes in the district are yielding 1.16 students per home w/ recent new construction homes producing an even higher yield of 1.32 students per home
- The districts remaining new home lot supply could yield another 300+ students over the next decade
- With larger outgoing 12<sup>th</sup> grade classes than incoming Kindergarten and 1<sup>st</sup> grade classes, future resident enrollment is projected to remain level (near 4,000 students) over the next five years (Moderate Scenario)
- The district's overall enrollment will depend on how many transfers are allowed into the district
- If the district maintains the current level of 300 scholars, then district enrollment is likely to remain in the 4,200-4,400 range for the next few years and possible grow towards 4,500 students by 2032



16980 Dallas Parkway  
Suite 101  
Dallas, Texas 75248

[www.schooldistrictstrategies.com](http://www.schooldistrictstrategies.com)

Although School District Strategies (SDS) has used commercially reasonable efforts to obtain information from sources it believes to be reliable and accurate, SDS does not guarantee the accuracy or completeness of such information. Information presented in this report represents SDS's estimates as of the date of the report and is subject to change without notice. This report is not intended as a recommendation or endorsement of any action taken by you or any third party in regard to the subject matter of this report or any other real estate activity. SDS WILL HAVE NO LIABILITY FOR INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING (BUT NOT LIMITED TO) LOST PROFITS, OR DIMINUTION IN VALUE OF YOUR BUSINESS OR PROPERTY, ARISING FROM OR RELATING TO SDS'S SERVICES HEREUNDER, REGARDLESS OF ANY NOTICE OF THE POSSIBILITY OF SUCH DAMAGES AND WHETHER OR NOT SUCH DAMAGES ARE REASONABLE OR FORESEEABLE UNDER THE APPLICABLE CIRCUMSTANCES. SDS'S LIABILITY ON ANY CLAIM OF ANY KIND, INCLUDING NEGLIGENCE, FOR ANY LOSS OR DAMAGE ARISING OUT OF, CONNECTED WITH, OR RESULTING FROM THIS REPORT OR THE SERVICES PROVIDED BY SDS SHALL IN NO SINGLE CASE, OR IN THE AGGREGATE, EXCEED THE AMOUNTS ACTUALLY PAID TO SDS IN CONNECTION WITH THE REPORT.

The following contingencies and limiting conditions are noted as fundamental assumptions that may affect the accuracy or validity of the analysis and conclusions set forth in this report. Specifically, the parties assume: that the Dallas-Ft. Worth metropolitan area (including Wise County), the State of Texas, and the nation as a whole will not suffer any major economic shock during the time period of the forecast contained in this report; that general population levels will continue to increase at or above the rate forecast; that the public and third party sources of statistical data and estimates used in this analysis are accurate and complete in all material respects, and that such information is a reasonable resource for project planning purposes; the proposed real estate development projects described herein, when completed, will be designed, promoted, and managed in a manner that will have an impact on the local market that is reasonably consistent with other similar projects in the past; and that the recommendations set forth in this report will be acted upon within a reasonable period of time to preclude major changes in the factual conditions evaluated.

Copyright 2022 School District Strategies.

7. Staffing Efficiency Analysis

**Presenter:** Dr. Jennifer DuPlessis, Assistant Superintendent of Finance and Operations



LOVEJOY  
INDEPENDENT SCHOOL DISTRICT  
EST. 1917

# Lovejoy ISD Staffing Review

Karen Dooley

February 7, 2022



HR Services

*This information is provided for educational purposes only to facilitate a general understanding of the law or other regulatory matter. This information is neither an exhaustive treatment on the subject nor is this intended to substitute for the advice of an attorney or other professional advisor. Consult with your attorney or professional advisor to apply these principles to specific fact situations*



# TASB Staffing Review Process

## Data Collection

Staff data and processes

Site visit and interviews

## Analysis

Peer comparison

Benchmark comparison

## Build Models for Improvement

Align with benchmarks

Address needs

# Benchmarking





# Benchmarking Data

---

- Why benchmark?
- What benchmarks were used in this analysis?



# Historical Data

	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	% change
<b>Student Enrollment</b>	4,070	4,222	4,272	4,365	4,206	3.3%
<b>Total Teaching Staff</b>	293.17	302.98	292.09	292.78	285.59	-2.6%
Teachers per 1,000 Students	72.00	71.80	68.40	67.10	67.90	-5.7%
<b>Total Campus Admin Staff</b>	14.88	15.57	17.00	16.00	16.00	7.5%
Campus Admin Staff per 1,000 Students	3.70	3.70	4.00	3.70	3.80	2.7%
<b>Total Support Staff</b>	57.34	57.11	68.99	68.89	66.00	15.1%
Support Staff per 1,000 Students	14.10	13.50	16.10	15.80	15.70	11.3%
<b>Total Central Admin Staff</b>	10.00	10.64	12.64	11.18	13.00	30.0%
Central Admin Staff per 1,000 Students	2.50	2.50	3.00	2.60	3.10	24.0%
<b>Total Educational Aides</b>	30.64	31.70	33.54	39.73	38.77	26.5%
Educational Aides per 1,000 Students	7.50	7.50	7.90	9.10	9.20	22.7%
<b>Total Auxiliary Staff</b>	157.14	159.40	161.79	186.17	171.59	9.2%
Auxiliary Staff per 1,000 Students	38.60	37.80	37.90	42.70	40.80	5.7%
<b>Total Personnel</b>	563.17	577.40	586.05	614.75	590.95	4.9%
Personnel per 1,000 Students	138.40	136.80	137.20	140.80	140.50	1.5%

\*Data Source: PEIMS Standard Report for Staff FTE and Student Enrollment

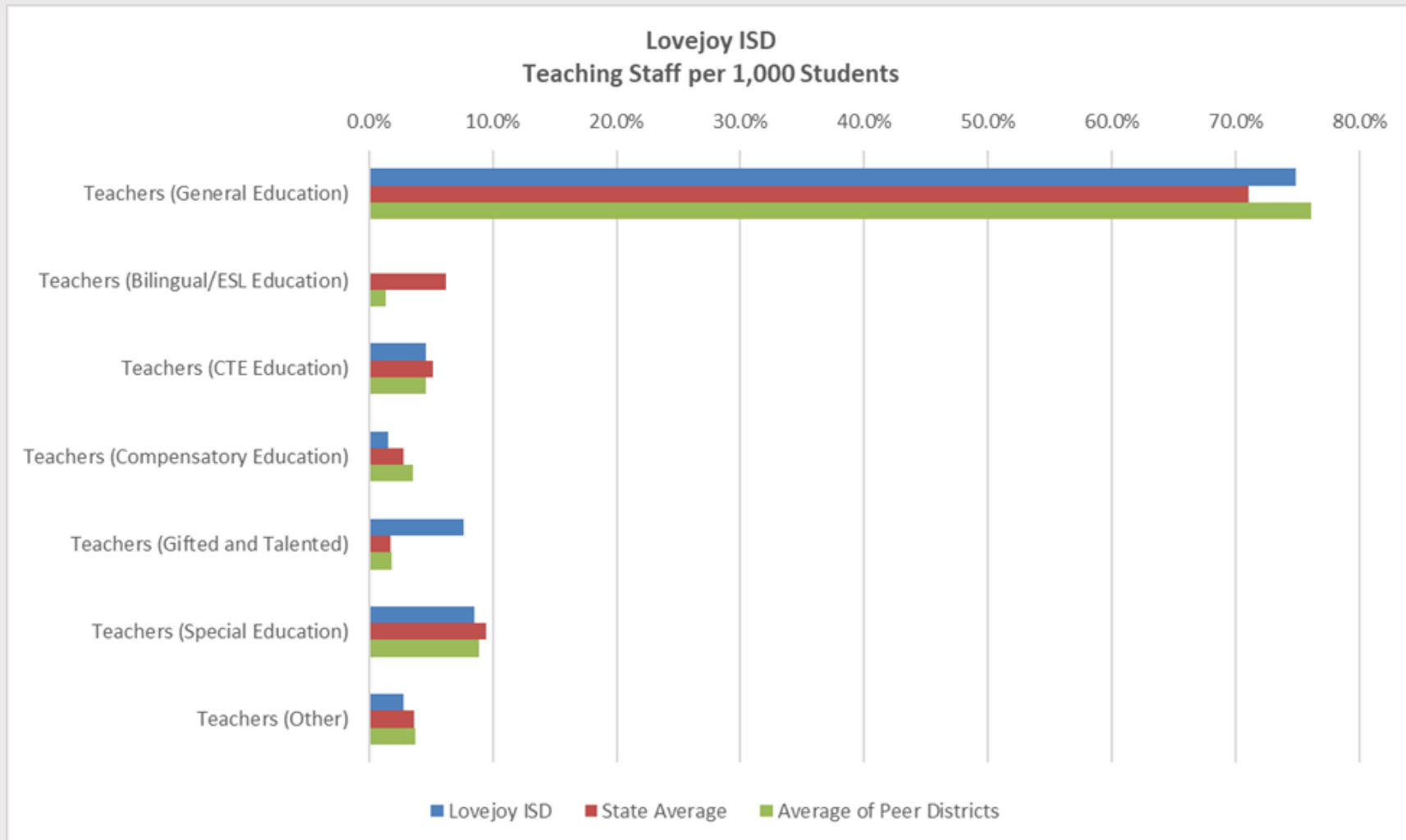


# Historical Data

	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	% change
<b>Student Enrollment</b>	4,222	4,272	4,365	4,206	4,345	2.9%
<b>Total Teaching Staff</b>	302.98	292.09	292.78	285.59	284.90	-6.0%
Teachers per 1,000 Students	71.80	68.40	67.10	67.90	65.60	-8.6%
<b>Total Campus Admin Staff</b>	15.57	17.00	16.00	16.00	16.40	5.3%
Campus Admin Staff per 1,000 Students	3.70	4.00	3.70	3.80	3.80	2.7%
<b>Total Central Admin &amp; Support Staff</b>	67.75	81.63	80.07	79.00	63.00	-7.0%
Central Admin Staff per 1,000 Students	16.10	19.10	18.30	18.80	14.50	-9.9%
<b>Total Educational Aides</b>	31.70	33.54	39.73	38.77	33.20	4.7%
Educational Aides per 1,000 Students	7.50	7.90	9.10	9.20	7.60	1.3%
<b>Total Auxiliary Staff</b>	159.40	161.79	186.17	171.59	146.50	-8.1%
Auxiliary Staff per 1,000 Students	37.80	37.90	42.70	40.80	33.70	-10.8%
<b>Total Personnel</b>	577.40	586.05	614.75	590.95	544.00	-5.8%
Personnel per 1,000 Students	136.80	137.20	140.80	140.50	125.20	-8.5%



# Teaching Staff





# Elementary Comparison

Elementary Peer Comparison			
Grade	Lovejoy ISD	State Average	Average of Peer Districts
Kindergarten	16.7	17.7	18.0
Grade 1	17.2	18.0	18.5
Grade 2	19.5	18.0	18.7
Grade 3	16.3	18.2	18.7
Grade 4	16.2	18.3	18.2



# Intermediate Comparison

Intermediate Peer Comparison		
Grade	Lovejoy ISD	Average of Peer Districts
Grade 5	21.9	20.6
Grade 6	23.9	20.2



# Middle School Comparison

Middle School Peer Comparison		
	Lovejoy ISD	Average of Peer Campuses
Professional Staff:		
Teachers	46.5	53.0
Teachers per 100 Students:	6.2	6.5
Professional Support	5.6	5.4
Professional Support per 100 Students:	0.7	0.7
Counselor	2.0	1.7
Counselor per 100 Students:	0.3	0.2
Librarian	1.0	0.2
Librarian per 100 Students:	0.1	0.0
Campus Administration	3.8	2.4
Campus Admin per 100 Students:	0.5	0.3
Educational Aides	6.3	9.0
Educational Aides per 100 Students	0.8	1.1
Number of Students per Teacher	16.2	15.5



# High School Comparison

High School Peer Comparison		
	Lovejoy ISD	Average of Peer Campuses
Professional Staff:		
Teachers	101.2	98.4
Teachers per 100 Students:	6.3	6.9
Professional Support	7.5	9.7
Professional Support per 100 Students:	0.5	0.7
Counselor	4.0	3.7
Counselor per 100 Students:	0.2	0.3
Librarian	1.0	0.6
Librarian per 100 Students:	0.1	0.0
Campus Administration	5.8	5.8
Campus Admin per 100 Students:	0.4	0.4
Educational Aides	9.8	12.0
Educational Aides per 100 Students	0.6	0.8
Number of Students per Teacher	15.9	14.5

# Summary of Findings & Options





# Library Staffing

Campus	2021-2022 Enrollment	Librarian	Aide, Library
<b>Secondary Schools</b>			
Lovejoy HS	1,643	1.0	0.0
Willow Springs MS	785	1.0	0.0
<i>Secondary Total</i>	2,428	2.0	0.0
<b>Elementary Schools</b>			
Sloan Creek IS	659	0.0	2.0
Hart ES	586	1.0	0.0
Puster ES	661	1.0	0.0
<i>Elementary Total</i>	1,906	2.0	2.0
<b>All Campuses Total</b>	<b>4,334</b>	<b>4.0</b>	<b>2.0</b>



# Library Staff

---

- Consider the adoption of the alternate library staffing model.
  - Addition of one librarian
  - Absorption of one library aide
  - Equity among campuses
  - 1.4 per 1,000 students compared to 1.6



# Campus Clerical Staffing

Secondary Schools	2021-2022 Enrollment	Campus Secretary	Clerk, Receptionist	Bookkeeper, Registrar	Sub-Total Clerical
Lovejoy HS	1,643	2.0	3.0	3.0	8.0
Willow Springs MS	785	1.0	2.0	1.0	4.0
<b>Secondary Total</b>	<b>2,428</b>	<b>3.0</b>	<b>5.0</b>	<b>4.0</b>	<b>12.0</b>

<sup>1</sup>Clerical positions per 1,000 Secondary students = 5.5 (with a minimum of 3 positions)

Elementary Schools	2021-2022 Enrollment	Campus Secretary	Clerk, Receptionist	Bookkeeper, Registrar	Sub - Total Clerical
Sloan Creek IS	659	1.0	3.0	0.0	4.0
Hart ES	586	1.0	2.0	0.0	3.0
Puster ES	661	1.0	2.0	0.0	3.0
<b>Elementary Total</b>	<b>1,906</b>	<b>3.0</b>	<b>7.0</b>	<b>0.0</b>	<b>10.0</b>



# Campus Clerical Staff

---

- Redirect one campus clerical position.
  - Secondary benchmark is 5.5/1,000
  - Elementary benchmark is 4.5/1,000
  - SCIS – one position above benchmark
  - LHS – one position below benchmark



# Instructional Aide Staffing

Campus	2021-2022 Enrollment	Aide, Edu	Aide, Pre-K	Aide, ISS	Aide, Library	Aide, PE	Aide, Clinic	Guest Educ	Aide, Other	Aide, SPED	Sub-Total
<b>Secondary Schools</b>											
Lovejoy HS	1,643	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.0	7.0	12.0
Willow Springs MS	785	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	6.0	8.0
<i>Secondary Total</i>	2,428	0.0	0.0	0.0	0.0	0.0	0.0	5.0	2.0	13.0	20.0
<b>Elementary Schools</b>											
Sloan Creek IS	659	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	4.0	8.0
Hart ES	586	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	5.0	6.0
Puster ES	661	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	6.0	7.0
Lovejoy Child Dev Ctr	181	0.0	4.0	0.0	0.0	0.0	0.0	1.0	10.0	0.0	15.0
<i>Elementary Total</i>	2,087	0.0	4.0	0.0	2.0	0.0	0.0	5.0	10.0	15.0	36.0
<b>All Campuses Total</b>	<b>4,515</b>	<b>0.0</b>	<b>4.0</b>	<b>0.0</b>	<b>2.0</b>	<b>0.0</b>	<b>0.0</b>	<b>10.0</b>	<b>12.0</b>	<b>28.0</b>	<b>56.0</b>



# Instructional Aides

---

- Consider the addition of five general education aides.
  - 14.8/1,000 students
  - Recommendation includes some absorptions as well



# Special Education Identified

Campus	2021-2022 Enrollment	Total SpEd Students	Actual SpEd Percent
<b>Secondary Schools</b>			
Lovejoy HS	1,643	100	6.1%
Willow Springs MS	785	52	6.6%
<i>Secondary Total</i>	2,428	152	6.3%
<b>Elementary Schools</b>			
Sloan Creek IS	659	77	11.7%
Hart ES	586	82	14.0%
Puster ES	661	83	12.6%
Lovejoy Child Dev Ctr	181	10	5.5%
<i>Elementary Total</i>	2,087	252	12.1%
<b>All Campuses Total</b>	<b>4,515</b>	<b>404</b>	<b>8.9%</b>



# Special Education Teachers

---

- Consider absorption of eight special education teachers.
  - State average is 1:15
  - Resource/Inclusion (-7 teachers)
  - Life Skills/Autism (-1 teacher)



# Special Education Aides

---

- Consider absorption of three special education aides.
  - State average is 1:7 for all staff
  - Resource/Inclusion (-5 aides)
  - Life Skills/Autism (+2 aides)



# Elementary Teaching Staff

	Total Campuses		
	2021-2022		
Grade Level	Enroll	Sect	Avg
Pre-K	57	4	14.3
Kindergarten	205	10	20.5
1st	210	10	21.0
2nd	227	11	20.6
3rd	303	14	21.6
4th	302	14	21.6



# Elementary Teacher Positions

---

- Consider absorption of five elementary teachers through attrition.
  - Current ratio is 20.7
  - Ratio would increase to 21.0
  - Based on 22:1 in PreK- grade 4 (PreK – 1, 2<sup>nd</sup> – 1, and 3<sup>rd</sup> – 3)



# Intermediate Teaching Staff

	Sloan Creek IS
<b>Current Class Average</b>	20.9
Current Master Schedule	8/6
2021-2022 Enrollment	659
Current Seats Needed	5,272
Current Teacher FTEs	42.0
Current Sections	252
<b>Theoretical Class Average</b>	20.9
Available Teacher FTEs	42.0
Available Sections	252
Theoretical Average Option - 8/7	17.9
Theoretical Average Option - 7/6	18.3



# Intermediate Teacher Positions

---

- Consider absorption of five intermediate teachers through attrition.
  - State average is 22-24 students per class
  - Current average is 20.9
  - Ratio would increase to 23.0
  - Consider master schedule adjustment



# MS Teaching Staff

	Willow Springs MS
<b>Current Class Average</b>	24.5
Current Master Schedule	8/6
2021-2022 Enrollment	785
Current Seats Needed	6,280
Current Teacher FTEs	42.8
Current Sections	257
<b>Theoretical Class Average</b>	23.4
Available Teacher FTEs	44.8
Available Sections	269
Theoretical Average Option - 8/7	20.0
Theoretical Average Option - 7/6	20.4



# Middle School Teacher Positions

---

- Consider absorption of two middle school teachers through attrition.
  - State average is 22-24 students per class
  - Theoretical average is 23.4
  - Ratio would increase to 23.0
  - Consider master schedule adjustment



# HS Teaching Staff

	Lovejoy HS
<b>Current Class Average</b>	24.2
Current Master Schedule	8/6
2021-2022 Enrollment	1,643
Current Seats Needed	13,144
Current Teacher FTEs	90.7
Current Sections	544
<b>Theoretical Class Average</b>	23.1
Available Teacher FTEs	94.7
Available Sections	568
Theoretical Average Option - 8/7	19.8
Theoretical Average Option - 7/6	20.2



# High School Teacher Positions

---

- Consider absorption of one high school teacher through attrition.
  - State average is 22-25 students per class
  - Theoretical average is 23.1
  - Ratio would increase to 23.5
  - Consider master schedule adjustment



# Gifted and Talented

---

- Evaluate cost effectiveness and sustainability of current program and opportunity for change.
  - 19.7 percent of students are G/T and 6.7 percent of teachers are in program
  - Peer district is 21.1 percent with 2.6 percent of teachers in the program
  - State average – 1.9 Peer average – 1.8
  - Estimated at nine positions



# Dyslexia

---

- Consider the future addition of one dyslexia position.
  - 3.25 current staff
  - Projected growth is 102 students
  - Program is being supported by other staff



# HS Athletic Staff

Lovejoy HS				
Class Period		Students	Coaches	Average
Period 1	Boys	242	28	8.6
	Girls	32	3	10.7
	<b>Total</b>	274	31	8.8
Period 4	Boys	10	1	10.0
	Girls	31	4	7.8
	<b>Total</b>	41	5	8.2
Period 8	Boys	200	8	25.0
	Girls	228	19	12.0
	<b>Total</b>	428	27	15.9
<b>Total</b>		<b>743</b>	<b>63</b>	<b>11.8</b>



# HS Athletic Periods

---

- Consider converting 31 HS athletic periods to academic periods.
  - Coach to student athlete ratio is 1:11.8
  - Academic class average is 1:24.2
  - Ratio would increase to 1:23.2



# MS Athletic Staff

		Willow Springs MS		
Class Period		Students	Coaches	Average
Period 1	Boys	144	8	18.0
	Girls	100	7	14.3
	<b>Total</b>	244	15	16.3
Period 8	Boys	147	9	16.3
	Girls	78	6	13.0
	<b>Total</b>	225	15	15.0
<b>Total</b>		<b>469</b>	<b>30</b>	<b>15.6</b>



# MS Athletic Periods

---

- Consider converting 10 MS athletic periods to academic periods.
  - Coach to student athlete ratio is 1:15.6
  - Academic class average is 1:23.5
  - Ratio would increase to 1:23.5



# Physical Education

---

- Consider the discontinuation of assigning coaches to ES and IS PE.
  - Assign coaches to core teaching assignments at the MS and HS
  - Improve flexibility in master schedule
  - More effective ES and IS PE program



# Maintenance Staff

Benchmark Job Title	Lovejoy ISD	Avg of Peers
Chief Facilities & Operations Officer	1.0	0.4
Dir of Maintenance	0.0	0.8
Maintenance Supervisor	1.0	0.0
Maintenance Foreman	0.0	0.6
Energy Manager	0.0	0.3
Carpenter	0.0	0.6
Electrician (Journeyman License)	1.0	0.9
General Maintenance Worker	2.0	2.8
Groundskeeper	2.7	6.3
HVAC Mechanic (Licensed)	0.0	1.6
Painter	0.0	0.8
Pest Control Specialist	0.3	0.3
Plumber (Journeyman License)	0.0	0.8
Warehouse Supervisor	0.0	0.3
Warehouse Assistant	0.0	0.1
<b>Total</b>	<b>8.0</b>	<b>16.3</b>
Student Enrollment	4,325	5,013
Staff per 1,000 Students	1.8	3.2



# Maintenance Staff

---

- Consider the future addition of one general maintenance position.
  - APPA standard is 1:67,500 GSF
  - Need applicant with plumbing experience
  - Redirect 0.5 ground position to maintenance



# Custodial Staff

Benchmark Job Title	Lovejoy ISD	Avg of Peers
Custodial Supervisor	1.0	0.8
High School Lead Custodian	1.0	0.8
Elementary School Lead Custodian	3.0	1.6
Custodian	23.0	32.5
<b>Total</b>	<b>28.0</b>	<b>35.6</b>
Student Enrollment	4,325	5,013
Staff per 1,000 Students	6.5	7.1



# Custodial Staff

---

- Determine if additional custodian positions are warranted in the future.
  - APPA standard is 1:21,000 CSF
  - Current ratio is 1:23,954
  - Need five positions to be at standard



# Transportation

---

- Consider filling the transportation lead position in the future with a full-time employee.
  - Department is being led by a part-time interim
  - Costs would be offset with funds allocated for the interim



# Safety and Security

---

- Consider the future absorption of two security guard positions or continue funding via donations.
  - Department efficiency would improve
  - 1.2 per 1,000 students compared to 0.6

# Looking Ahead





# Cost Estimate

Alternative Staffing Models	Absorptions / Additions	Individual personnel cost	Cost increase / savings
<b>Administrative/Professional Staff</b>			
Addition of 1 librarian (pg. 18)	1.0	\$58,959	\$58,959
<b>Instructional Support Staff</b>			
Absorption of 1 library aide (pg. 18)	(1.0)	\$21,500	(\$21,500)
Addition of 5 educational aides (pg. 23)	5.0	\$21,500	\$107,500
<b>Teachers</b>			
Absorption of 5 elementary teachers (pg. 32)	(5.0)	\$58,959	(\$294,795)
Absorption of 5 intermediate teachers (pg. 34)	(5.0)	\$58,959	(\$294,795)
Absorption of 2 middle school teachers (pg. 38)	(2.0)	\$58,959	(\$117,918)
Absorption of 1 high school teacher (pg. 43)	(1.0)	\$58,959	(\$58,959)
<b>Special Education</b>			
Absorption of 8 special education teachers (pg. 28)	(8.0)	\$58,959	(\$471,672)
Absorption of 3 special educational aides (pg. 28)	(3.0)	\$21,500	(\$64,500)
<b>Total Cost Increase / (Savings)</b>			<b>(\$1,157,680)</b>

<sup>1</sup> All absorptions achieved through attrition.



# Cost Avoidance Opportunities

Alternative Staffing Models	Absorptions / Additions	Individual personnel cost	Cost increase / savings
<b>Teachers</b>			
Absorption of 9 GT positions (pg. 30)	(9.0)	\$58,959	(\$530,631)
<b>Athletics</b>			
Absorption of 10 MS athletic periods (cost avoidance pg. 47)	(10.0)	\$9,347	(\$93,470)
Absorption of 31 HS athletic periods (cost avoidance pg. 46)	(31.0)	\$9,347	(\$289,757)
<b>Total Cost Increase / (Savings)</b>			<b>(\$913,858)</b>

<sup>1</sup> *All absorptions achieved through attrition.*



# Future Considerations

Alternative Staffing Models	Absorptions / Additions	Individual personnel cost	Cost increase / savings
<b>Teacher</b>			
Addition of 0.5 dyslexia teacher (pg. 30)	0.5	\$58,959	\$29,480
<b>Maintenance</b>			
Addition of 1 general maintenance worker (pg. 50)	1.0	\$50,000	\$50,000
Addition of 5 custodians (pg. 53)	5.0	\$27,500	\$137,500
Absorption of 2 security guards (pg. 57)	(2.0)	\$25,000	(\$50,000)
<b>Total Cost Increase / (Savings)</b>			<b>\$166,980</b>

<sup>1</sup> *All absorptions achieved through attrition.*

Karen Dooley, Senior HR Consultant

800.580.7782

hrservices@tasb.org

Follow us:

 @tasbhrs

 LinkedIn

 @tasbhrs



HR Services

*The information in this presentation may include the intellectual property of third parties.*

©/4/22 Texas Association of School Boards, Inc. All rights reserved.

8. Instructional Program Updates  
**Presenter:** Executive Cabinet Members

# Instructional Programming Update

SANCY FULLER

Executive Director of Special Education and  
Student Supports

DR. LAURIE TINSLEY

Assistant Superintendent of Curriculum and  
Instruction

ANNA KOENIG

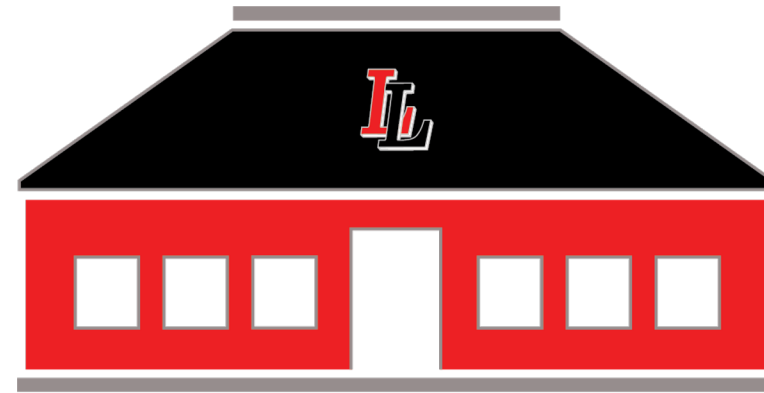
Executive Director of Human Resources and  
Communications

KEVIN PARKER

Executive Director of Student Services

BOARD WORKSHOP

February 7, 2022



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT

EST. 1917

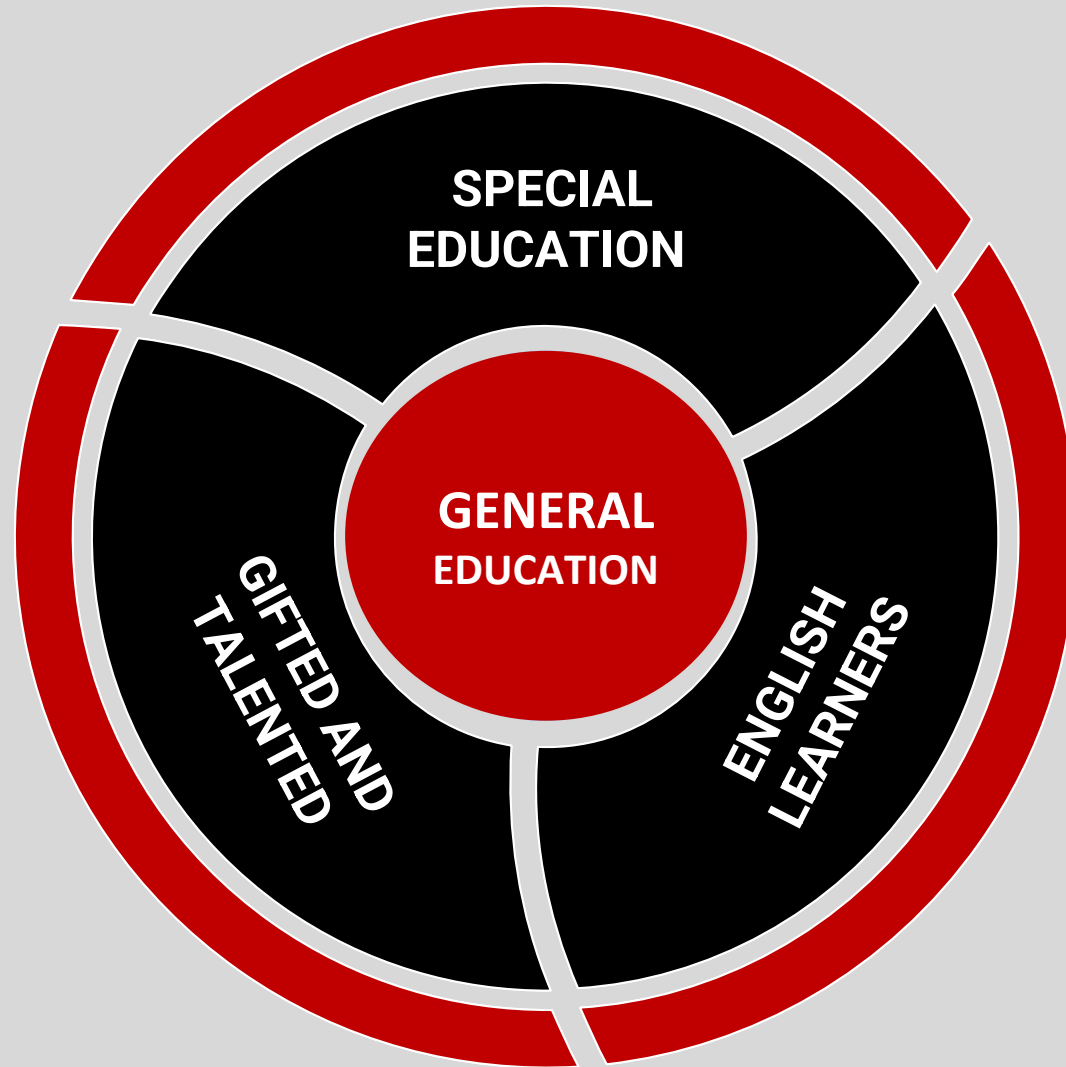
# LOVEJOY ISD

# INSTRUCTIONAL

# PROGRAMMING

---

Together, we are committed to having high expectations and strong systems that achieve equitable outcomes for every student to accelerate a child's personal growth and academic development.



01

## **PROGRAM POLICIES AND GUIDELINES**

- **Federal**
- **State**

02

## **PROGRAM DESIGN**

- **Adhere to policies and guidelines**
- **Determine program model for educating students**

03

## **STAFFING**

- **Driven by program model adopted by the district**
- **Staff Certifications**

04

## **SCHEDULING**

- **Master Schedules**
- **Course Guides**
- **Staff Assignments**



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT

---

EST. 1917

**SPECIAL EDUCATION PROGRAMMING**

# OVERVIEW

## SPECIAL EDUCATION PROGRAMMING

---

Special education services is of great importance for children with learning differences, because it provides **students the opportunity to receive quality education in line with their unique needs**. Special education enables every student to gain a high level of independence and reach their full potential.

A photograph of a classroom scene. In the center, a young boy with dark hair, wearing a red shirt, is looking down at a tablet computer. To his right, another child with light hair, wearing a dark blue shirt, is also looking at the tablet and pointing at the screen. The background is slightly blurred, showing other children and a bright, well-lit room. The text is overlaid in the center of the image.

*All students are general education students, some of whom receive special education services*

# Special Education

## Continuum of Services

---

**Mainstream**

**Mainstream with  
Modifications**

**Content  
Mastery**

**Resource  
Room**

**Self-Contained**

**Homebound**

**Hospital Residential**

**Mainstream** – All classes are in the general education setting

**Mainstream with Modifications** – All classes are in the general education setting but course requirements have been changed with the permission of an ARD Committee

**Content Mastery** – Additional academic support on specific assignments is provided in a Special Education setting by the Special Education staff

**Resource Room** – Instruction is provided in a Special Education setting by the Special Education staff less than 50% of the school day

**Self-Contained Classroom** – Instruction is provided in a Special Education setting by the Special Education staff more than 50% of the school day

**Homebound** – Academic instruction is provided in the student's home due to medical or emotional disabilities

**Hospital** – Academic instruction is provided in a hospital setting due to serious illness or injury

**Residential** – Academic instruction is provided in a residential treatment facility

# LOVEJOY ISD

## SPECIAL EDUCATION PROGRAM MODEL

---

### **Mainstream**

General Education with accommodations

General Education with inclusion support

*Service time is normally provided by an educational aide*

### **Mainstream with Modifications**

General Education with reduction of TEKS

### **CoTeach**

General Education & Special Education Teacher in the same room  
teaching core content (RLA & Math)

# LOVEJOY ISD

## SPECIAL EDUCATION PROGRAM MODEL

---

### **Content Mastery**

Quick pullout from General Education to work on a need/concept  
(short in time duration)

### **Resource**

Instruction is provided in a Special Education room

### **Self-Contained**

Instruction is provided in a Special Education setting for more than 50% of  
the day \*Life Skills

*Student plans are determined by the campus ARD committee*

# EXAMPLES

## SPECIAL EDUCATION PROGRAM MODELS

---

**Mainstream services** - Inclusion services without the option of co-teach

**Resource & Self Contained** - Classrooms with increased student numbers and varied academic abilities

# SPECIAL EDUCATION PERCENTAGES

---

<b>State</b>	10.5%	
<b>Peer Districts</b>	10.8%	
<b>Lovejoy</b>	8.9%	(404 Students)

# LOVEJOY ISD

## SPECIAL EDUCATION PROGRAM STAFFING INFORMATION

---

- The state average for special education staffing is one teacher per 15 special education students and one special education staff member to seven special education students when educational aides are included.
- Currently, Lovejoy ISD averages one teacher per 11.1 special education students and one special education staff member per 5.9 students. This equates to approximately seven teachers above the state average and one aide above the state average.

# LOVEJOY ISD

## SPECIAL EDUCATION PROGRAM STAFFING INFORMATION

---

- Lovejoy ISD staffs 6.9 special education teachers per 100 special education students. The state average is 5.8 and the peer district average is 5.7 teachers per 100 special education students. (19-20 TAPR)
- Current Texas rules leaves the determination of staffing for special education services to local district discretion. It is important to note that the needs of individual students can vary, and some students require more support than others at any given time.



# GIFTED AND TALENTED PROGRAMMING

# OVERVIEW

## GIFTED AND TALENTED PROGRAMMING

---

Offer K-12 students an array of appropriately challenging learning experiences by modifying the depth, complexity, and pacing of curriculum to meet the unique social, emotional, and intellectual needs of gifted and talented students.

Services for gifted/talented students are comprehensive, structured, sequenced, and appropriately challenging, including options in the four (4) foundation curricular areas: math, science, English language arts, reading, and social studies.  
Students are identified by area(s) of giftedness.

Gifted/talented students are ensured opportunities to work together as a group, work with other students, and work independently during the school day as well as the entire school year as a direct result of gifted/talented service options (19 TAC §89.3(1)).

# **LOVEJOY ISD**

# **GIFTED AND TALENTED PROGRAM MODEL**

---

## **ELEMENTARY**

K-2 students are served by the homeroom teacher through curriculum extensions and academic enrichment. Students in grades 3 and 4 attend gifted and talented classes for Integrated Studies (RLA and social studies) and/or math & science, depending on area(s) of giftedness.

## **INTERMEDIATE**

Students attend designated gifted and talented classes based on identified area(s) of giftedness. RLA, social studies, math, and science classes are offered.

# **LOVEJOY ISD**

# **GIFTED AND TALENTED PROGRAM MODEL**

---

## **MIDDLE SCHOOL**

Students attend designated gifted and talented classes based on identified area(s) of giftedness. RLA, social studies, math, and science classes are offered. Students may also choose to participate in an Independent Study elective.

## **HIGH SCHOOL**

Students attend designated G/T classes based on identified area(s) of giftedness. English, social studies, math, and science classes are offered. Students may also choose to participate in an Independent Study elective.

# LOVEJOY ISD

## GIFTED AND TALENTED PROGRAM STAFFING INFORMATION

---

- The district employs 3 times as many gifted and talented teachers as the state or peer district average.
- Lovejoy has 19.7 percent of its student population identified as GT compared to a similar district with 21.1 percent identified.
- Lovejoy is at 6.7 percent of all teachers assigned to gifted and talented teaching as compared to the state average of 1.8 percent and 2.6 percent peer district of it's total teaching population to the gifted and talented program.
- Variances in number of teaching staff for this area is based on the program model offered.

# EXAMPLES

## GIFTED AND TALENTED PROGRAM MODELS

---

### ELEMENTARY AND INTERMEDIATE

- Identified students are clustered together within designated heterogeneous or homogeneous classrooms. The classroom teacher has a minimum of 30 clock hours of professional learning which includes the nature and needs of gifted/talented students. Instruction is differentiated to support gifted and talented students within the general education setting. (8%)
- Identified students are served weekly in multidisciplinary pull-out program taught by campus gifted and talented teacher. Gifted and talented students participate in the pull out classroom an average of 2 to 3 hours per week. (40%)
- Gifted and talented teacher pushes into the gifted and talented cluster classroom, where the gifted and talented student is learning and assists with the enrichment and extensions for that student. (24%)

# EXAMPLES

## GIFTED AND TALENTED PROGRAM MODELS

---

### MIDDLE SCHOOL

- Gifted and talented content specific is a skills-based curriculum. The class/moves at a pace commensurate with students' abilities to retain information, compacting the skills to move beyond the basic requirements.
- Gifted and talented classes may be combined with an advanced level courses and instruction is differentiated. These classes are taught by a gifted and talented teacher.

# EXAMPLES

## GIFTED AND TALENTED PROGRAM MODELS

---

### HIGH SCHOOL

- Gifted and talented students are served through gifted and talented specific courses, Pre-AP and AP level courses.
- The class moves at a pace commensurate with students' abilities to retain information, compacting the skills to move beyond the basic requirements.
- Students have the opportunity to participate in fine arts, and academic competitions where their gifts/talents may be showcased.



**ENGLISH LEARNERS PROGRAMMING**

# **OVERVIEW**

## **ENGLISH LEARNERS PROGRAMMING**

---

English Learning is an intensive instructional program designed to develop proficiency in the listening, speaking, reading, and writing of the English language. All instruction is provided in English and utilizes the TEKS and ELPS for the cultivation of English language skills and the promotion of academic success in all grade level content areas.

# LOVEJOY ISD

## ENGLISH LEARNERS PROGRAM MODEL

---

- In Lovejoy ISD, English Learners/Emergent Bilinguals, receive ESL services in their self-contained classrooms in kindergarten through 2nd grade. All K-2 teachers are ESL certified.
- In grades 3-12, English Learners/Emergent Bilinguals receive services through their Reading Language Arts classes, with all 3-12 RLA teachers certified in ESL.

# LOVEJOY ISD

## ENGLISH LEARNERS PROGRAM STAFFING INFORMATION

---

- The district does not employ any ESL or Bilingual teachers. State average of ESL/Bilingual teachers is 6.2%
- Lovejoy has 0.9 percent of its student population identified as English Learners compared to the state average of 21.0 percent identified. similar district with 21.1 percent identified.

# EXAMPLES

## ENGLISH LEARNERS PROGRAM MODELS

---

- Inclusion of English Learners/Emergent Bilinguals in the general education classroom with native English speaking peers.
- Offer ESL classes with sheltered instruction in core content areas that include science, math, social studies and english language arts, depending on the student's individual language level.

# BEST PRACTICES FOR MASTER SCHEDULE DESIGN

---

## **An effective and efficient master schedule:**

- Schedule special populations first
- Eliminates inefficient class sizes
- Schedule students first, then assign the teachers
- Balance class sizes
- Build diverse rosters so classes included a more balanced ratio of students
- Guarantee common planning periods so teachers can collaboratively plan teaching and learning
- Utilize software designed for creating master schedules

# MASTER SCHEDULE FUTURE CONSIDERATIONS

---

## Options to best utilize and ensure efficiencies of our current resources (time and staff)

- Maintain teacher student ratios
- include all stakeholders/departments to develop the master schedule
- Consider multiple master schedule models
  - 6/8
  - 7/8
  - 6/7
  - 6.5/8
- Review fine arts and athletics programs
- Staff certification analysis



# QUESTIONS

9. Athletic Program Updates

**Presenter:** Kevin Parker, Executive Director of Student Services

# LISD Athletics Update

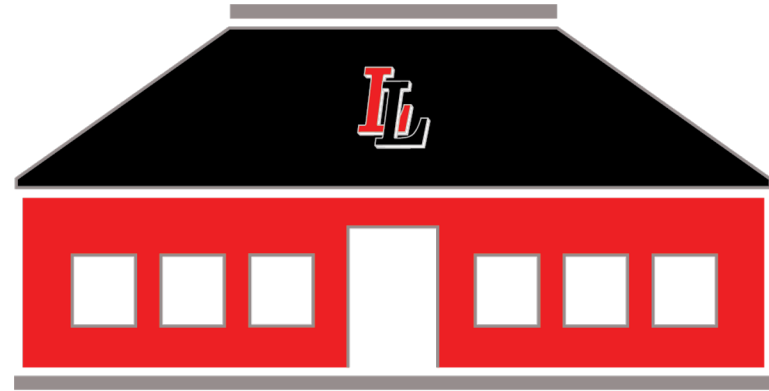
---

KEVIN PARKER

Executive Director of Student Services

BOARD WORKSHOP

February 7, 2022



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT

---

EST. 1917

# Student Services

---

ADDITIONAL INFORMATION

# Athletics Updates

---

## 2022-2024 UIL Realignment

### District 13-5A Basketball and Volleyball

Lovejoy  
Denison  
Greenville  
McKinney North  
Princeton  
Sherman  
Melissa

### District 7-5A Division II Football

Lovejoy  
Crandall  
Denison  
Greenville  
Melissa  
Mesquite Poteet  
Princeton  
Terrell



UNIVERSITY INTERSCHOLASTIC LEAGUE



# Athletics Updates

---

## Lovejoy Athletic Offerings

### Lovejoy High School

**Softball**  
**Baseball**  
**Volleyball**  
**Football**  
**Basketball (B&G)**  
**Cross Country (B&G)**  
**Golf (B&G)**  
**Soccer (B&G)**  
**Tennis (B&G)**  
**Track and Field (B&G)**  
**Wrestling (B&G)**  
**Swim and Dive (B&G)**

### Willow Springs Middle School

**Volleyball**  
**Football**  
**Basketball (B&G)**  
**Cross Country (B&G)**  
**Golf (B&G)**  
**Soccer (B&G)**  
**Tennis (B&G)**  
**Track and Field (B&G)**  
**Wrestling (B&G)**  
**Swim and Dive (B&G)**



# Athletics Updates

---

## Comparison Districts

<b>Willow Springs</b>	Volleyball	Football	Basketball	Track and Field	Cross Country	Soccer	Tennis	Wrestling	Golf	Swimming
<b>Allen ISD</b>	Volleyball	Football	Basketball	Track and Field	Cross Country		Tennis		Golf**	
<b>Rockwall ISD</b>	Volleyball	Football	Basketball	Track and Field	Cross Country	Soccer	Tennis	Gymnastics		
<b>Frisco ISD</b>	Volleyball	Football	Basketball	Track and Field	Cross Country	Soccer	Tennis			
<b>Wylie ISD</b>	Volleyball	Football	Basketball	Track and Field	Cross Country		Tennis			
<b>Argyle ISD</b>	Volleyball	Football	Basketball	Track and Field	Cross Country	Soccer	Tennis			
<b>Melissa ISD</b>	Volleyball	Football	Basketball	Track and Field	Cross Country	Soccer	Tennis	Wrestling	Softball	



# Athletics Updates

---

## Limitations for Our Middle School Golf Program

- Facility limitations-local courses limit the number of high school teams they allow to use their facilities. Facility use is typically reserved for high school golf teams.
- Before school practice is not a viable option.
- The high school golf team is always in season. Fall is for team golf and spring is for individual competition. Therefore, the focus and time of the coach is on the high school boys' and girls' teams.
- Middle school golf is not necessary for the development of golfers to compete at the high school level.



# Athletics Updates

---

## Limitations for Our Middle School Swim Program

- High school practices have to be shortened in order to make time for middle school practices which takes away preparation time from the high school team.
- No other local school districts have a middle school program of this nature. There are no middle school swim competitions available for student participation.
- Successful athletes in this program already swim in a local club program. Middle school swim promotes double workouts (club and school) at too young of an age and too low of a skill level.
- Lack of transportation (unavailable coaches to drive buses) and locker room supervision.



THANK YOU

10. Compensation Assessment Results

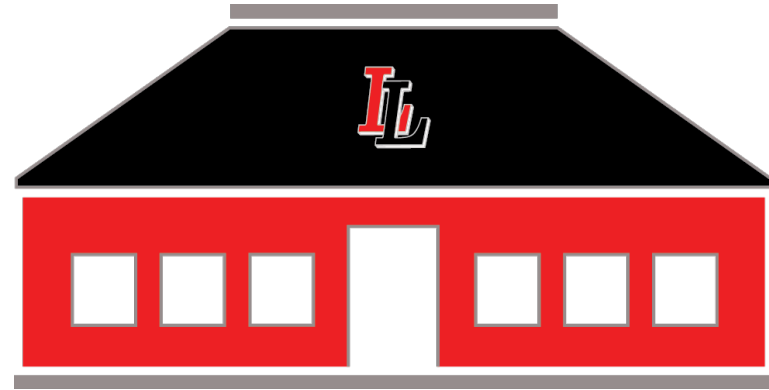
**Presenter:** Dr. Jennifer DuPlessis, Assistant Superintendent of Finance and Operations

# Compensation Assessment

---

**JENNIFER DUPLESSIS, PH.D.**  
ASSISTANT SUPERINTENDENT OF  
FINANCE & OPERATIONS

BOARD WORKSHOP  
FEBRUARY 7, 2022



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT  

---

**EST. 1917**

# 2022-2023: Reframing Our Story

Lovejoy Independent School District

## Focus Areas

*Mission: To propel every person to personal excellence.*

### Legacy of Excellence

- We will build upon Lovejoy ISD's legacy of excellence through a shared commitment to our mission and core values.
- We will maintain high expectations and leverage the collective impact of the Lovejoy ISD community to ensure achievement of outcomes on behalf of students.
- Lovejoy ISD traditions will enable us to honor the past, celebrate the present, and provide a continuing legacy for the future.
- We #LiveLovejoy.

### Future Ready Students

- Students will personify the graduate profile by experiencing challenging and engaging learning.
- Research-based instructional strategies will be strategically partnered with innovation.
- Profound learning will develop key skills essential to thriving now and in the future.
- Technology will be leveraged to enhance individualization, deepen learning, and prepare students for an increasingly technology-driven workforce.

### Financial Sustainability

- Lovejoy ISD will establish a plan for short and long-term financial sustainability.
- We will strategically balance financial decision-making with Lovejoy ISD's mission and commitment to the Lovejoy experience.
- A financial assessment, identification of priorities, and intentional decision-making process will support strategic financial planning.
- Zero-based budgeting will be utilized and transparency will be prioritized.



# Budget Priorities

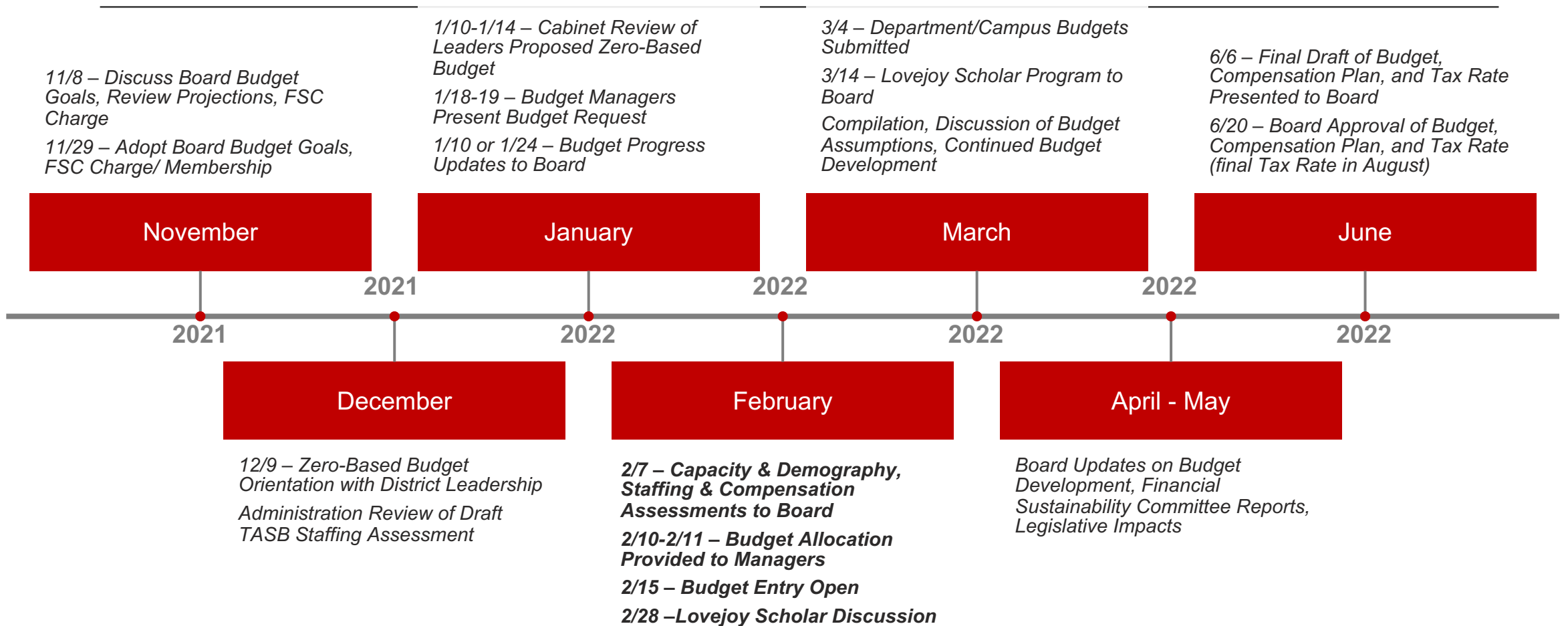
---

1. Fund Balance (3-5 Year Plan to Achieve 90 Days of Fund Balance)
2. Compensation
3. Attendance
4. Enrollment

The priorities will be achieved through:

- *Zero Based Budgeting*
- *Staffing Efficiency Study*
- *Financial Sustainability Committee*
- *Program Reviews*

# 2022-2023 Budget Development



# Compensation Considerations

---

SHARED AT BUDGET WORKSHOP

# Compensation Considerations

---

## Teaching Staff:

- Maintain 2021-2022 Supplemental Pay Step Increase for 2020-2021 Returning Teachers  $\approx$  \$125k as:
  - a Supplemental Pay,
  - by going to a Range for Teachers, *or*
  - including as a step increase or % increase with all teachers Provide 2021-2022 Step Increase to Teachers Started in 2021-2022
- Step Increase for All Teachers Including Increase from 2021-2022 Supplemental Pay  $\approx$  \$275k
- 1% Pay Increase for All Teachers from Total '21-22 Pay  $\approx$  \$297k

# Compensation Considerations

---

- ❑ Non-Teaching Staff:

- ❑ Internal Equity Adjustments ≈ \$20k

- ❑ Market-Based Adjustments to Non-Teaching Staff for those >5% out of Range in 2 Comparison Groups ≈ \$80k

- ❑ Additional Adjustments due to Market-Based Adjustments in Related, Hard-to-Fill Positions ≈ \$70k

- ❑ 1% Pay Increase for Non-Teaching Staff ≈ \$134k

# Compensation Considerations

---

- All Staff:

- 1% Pay Increase for All Staff from Total 2021-2022 Pay ≈ \$431k

- Consideration of Retention Incentive Approach Based on Financial Targets

# Historical Compensation Adjustments

From	To	Compensation Adjustment
2009 - 2010	2010 - 2011	3% increase
2010 - 2011	2011 - 2012	Salaries frozen; no step increase
2011 - 2012	2012 - 2013	Salaries frozen; no step increase
2012 - 2013	2013 - 2014	Salaries frozen; teachers/librarians/nurses step advancement given (two steps); board approved two one-time payments equal to 3% for all staff
2013 - 2014	2014 - 2015	3% increase + continuing 3% supplemental in two one-time payments
2014 - 2015	2015 - 2016	3% increase + continuing 3% supplemental in two one-time payments
2015 - 2016	2016 - 2017	3% increase + continuing 3% supplemental in two one-time payments
2016 - 2017	2017 - 2018	Salaries frozen for everyone except teacher scale given \$1,000 increase; board approved continuing two one-time payments equal to 3%
2017 - 2018	2018 - 2019	3% increase + continuing 3% supplemental in two one-time payments
2018 - 2019	2019 - 2020	Added supplemental payments into salary, then 3% increase districtwide; 3.5% increase for 15+ years of experience on teacher scale
2019 - 2020	2020 - 2021	Salaries frozen; 1.5% increase for teachers, librarians, nurses, counselors
2020 - 2021	2021 - 2022	Salaries frozen districtwide; board approved returning teachers given step increase in one-time payment

# Compensation Assessment

---

METHOD AND RESULTS

# Compensation Assessment Methods

---

- ❑ Texas Association of School Boards (TASB) Salary Survey

- ❑ 1,020 Texas public school districts are annually afforded the opportunity to participate in TASB's Salary Survey to capture data related to common school job benchmarks across the state. The 2020-2021 results from 576 participating districts were compiled and analyzed by TASB using standard statistical and mathematical calculations. Median values are published and made readily available to member districts' in an effort to support the growing need to create custom benchmarking related to compensation.

- ❑ TASB 2020-2021 Salary Survey results were analyzed across three comparison groups

# Compensation Assessment Methods

---

☐ Three Comparison Groups identified include:

- ☐ **Local Comparison Group** consisting of Allen ISD, Carroll ISD, Coppell ISD, Eanes ISD, \*Highland Park ISD, McKinney ISD, Melissa ISD, Plano ISD, Princeton ISD, Wylie ISD (Taylor County), and Wylie ISD (Collin County)
- ☐ **Staffing Review Group** consisting of Alamo Heights ISD, Denison ISD, \*Highland Park ISD, \*Lindale ISD, Lumberton ISD, Nederland ISD, Melissa ISD, Princeton ISD, Port Neches-Grove ISD, Whitehouse ISD, and Wylie ISD (Taylor County)
- ☐ **Region X Group** consisting of all participating school districts served through the Region 10 Education Service Center

*\* Highland Park ISD and Lindale ISD did not participate in the TASB 2020-2021 Salary Survey*

# Equity Assessment

---

- ❑ Every non-teaching position is assigned a hiring range in one of the following classifications:
  - District Leadership, District Instructional Leadership, Campus Instructional Leadership, Specialized Services, Technology Services, Clerical and Administrative Support, Maintenance, Operations, and Transportation Services, Student Nutrition Services, Tuition Based Program Services, and Various and Specific Services
- ❑ Employee compensation for each of these classifications were reviewed to identify areas of compensation inequity in terms of comparable experience to rate of pay
- ❑ Recommendation and Cost – Equity adjustments for six employees over five different classifications are being brought forth for consideration. Total budget impact to improve internal compensation equity is \$9,105.

# Market Assessment

---

## ❑ How Assessed

- ❑ Comparison data related to the market salaries of 81 common school district positions were examined across all three comparison groups (i.e. Local Comparison Group, Staffing Review Comparison Group, and the Region X Group).

The percent difference between Lovejoy's Market Median and the Market Median of each comparison group was calculated to fall within three categories:

- Positions falling 5% or more below the market median of a comparison group
- Positions falling between .99% and 5% below the market median of a comparison group
- Positions that meet or exceed the market median of a comparison group

# Market Assessment

Position	Local Comparison Group			Region X			Staffing Review Group			Lovejoy ISD			Market Median w/Local Comparison Group	Market Median w/Region X Comparison Group	Market Median w/Staffing Review Comparison Group
	Minimum Median	Market Median	Maximum Median	Minimum Median	Market Median	Maximum Median	Minimum Median	Market Median	Maximum Median	Minimum Median	Market Median	Maximum Median			
<b>Student Nutrition Area Supervisor</b> <i>analyzed against District Child Nutrition Supervisor</i>	\$25.42	\$31.42	\$36.20	\$26.66	\$29.94	\$36.87	\$15.35	\$19.97	\$25.09	\$16.59	\$23.04	\$25.44	● 0.7333	● 0.7695	● 1.1537
<b>Custodial Supervisor</b>	\$30.23	\$30.73	\$45.34	\$21.83	\$27.89	\$26.93	\$20.59	\$29.64	\$28.96	\$20.60	\$23.44	\$31.49	● 0.7628	● 0.8404	● 0.7908
<b>Computer Technician</b>	\$20.29	\$23.45	\$29.16	\$20.09	\$23.43	\$29.89	\$18.10	\$20.93	\$27.69	\$16.84	\$19.11	\$24.98	● 0.8149	● 0.8158	● 0.9130
<b>Maintenance Supervisor</b>	\$35.56	\$45.41	\$51.25	\$29.90	\$35.32	\$40.99	-	-	-	\$28.68	\$39.19	\$41.63	● 0.8630	● 1.1096	
<b>Cafeteria Worker</b>	\$10.92	\$13.12	\$15.90	\$10.38	\$12.07	\$14.98	\$11.09	\$13.20	\$17.29	\$10.10	\$12.45	\$14.42	● 0.9489	● 1.0319	● 0.9432

# Market Assessment

---

## ❑ Recommendation and Cost –

Five out of 81 positions were identified as lagging the market by falling 5% or more below market median with at least 2 comparison groups OR 13% or more below the Local Comparison Group for positions not represented in all three groups. These positions include Student Nutrition Area Supervisor, Custodial Supervisor, Computer Technicians, Maintenance Supervisor, and Student Nutrition specialists. Budget impact: \$60,885.

Additional market adjustments are recommended for 33 Related/Difficult to Hire positions in the areas of student nutrition and custodial operations. Budget impact: \$90,936

Total budget impact for recommended market adjustments: \$151,821

# Teacher Pay

---

## How Assessed

Lovejoy ISD Teacher pay was compared to all three comparison groups using the TASB 2020-2021 Salary Survey.

## Summary

Based on our Compensation Review, Lovejoy ISD teacher salary is above that of the Region X and Staffing Comparison groups at each 5 year increment measured. LISD teacher compensation falls under market only with the Local Comparison Group identified for this review and within 1% for teachers with 10-20 years of experience and within a maximum of 3.5% of the market median for teacher with 0-5 years of experience.

# Teacher Pay

---

Region X Comparison:



Staffing Review Comparison Group:

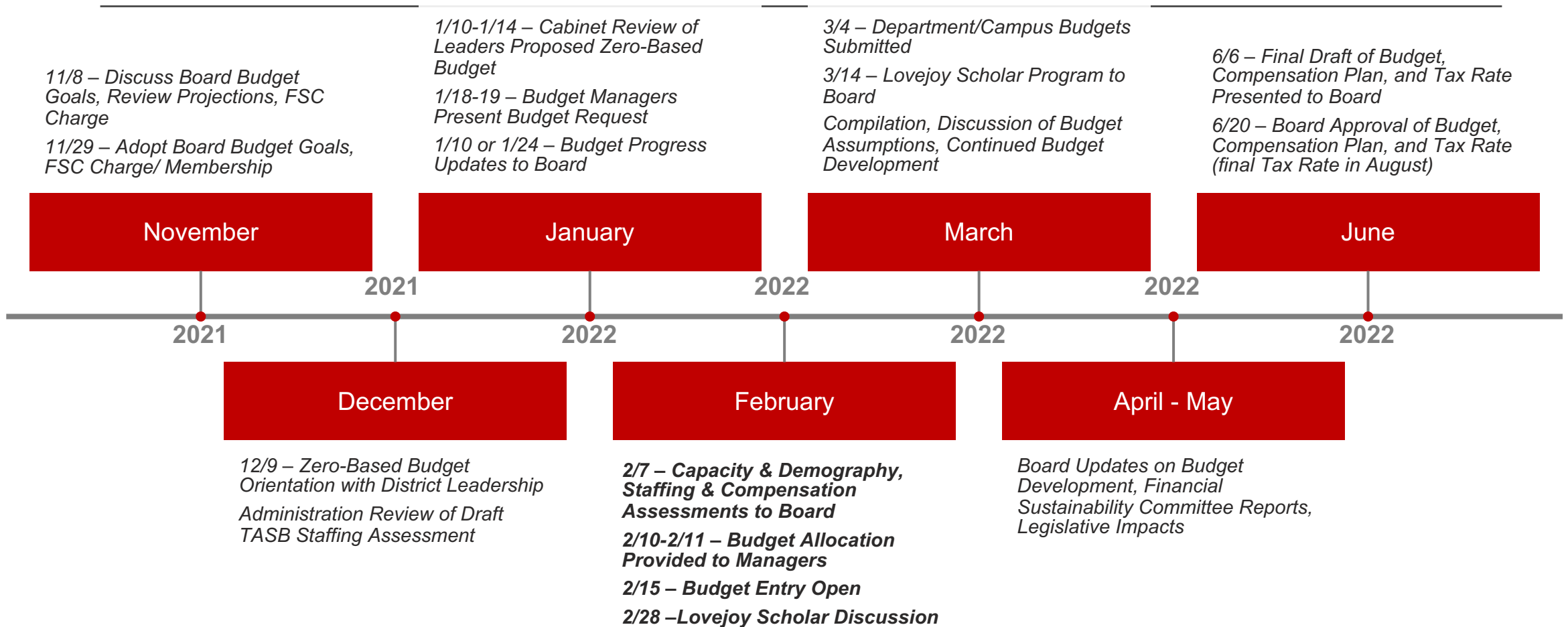


Local Comparison Group:



❑ Comparison results – no additional recommendation at this time other than general increase

# 2022-2023 Budget Development





THANK YOU

11. The Board called a brief recess from 9:33 PM to 9:39 PM.

**Presenter:** Barrett Owens, President

12. Average Daily Attendance and Financial Impact

**Presenter:** Kevin Parker, Executive Director of Student Services

# Attendance Update

---

KEVIN PARKER

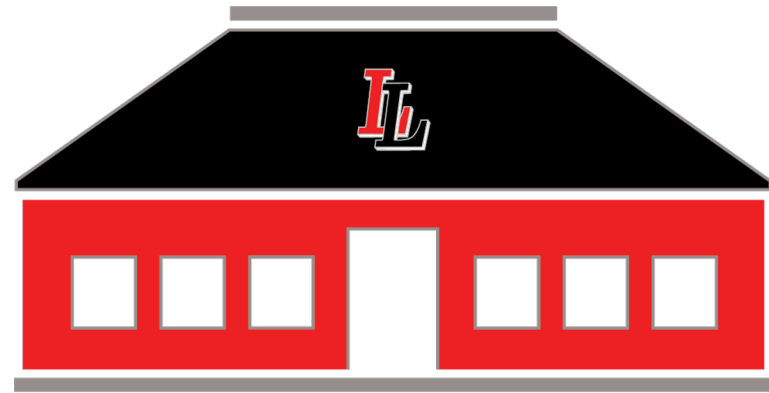
Executive Director of Student Services

DR. JENNIFER DUPLISSIS

Asst. Superintendent of Finance and  
Operations

BOARD WORKSHOP

February 7, 2022



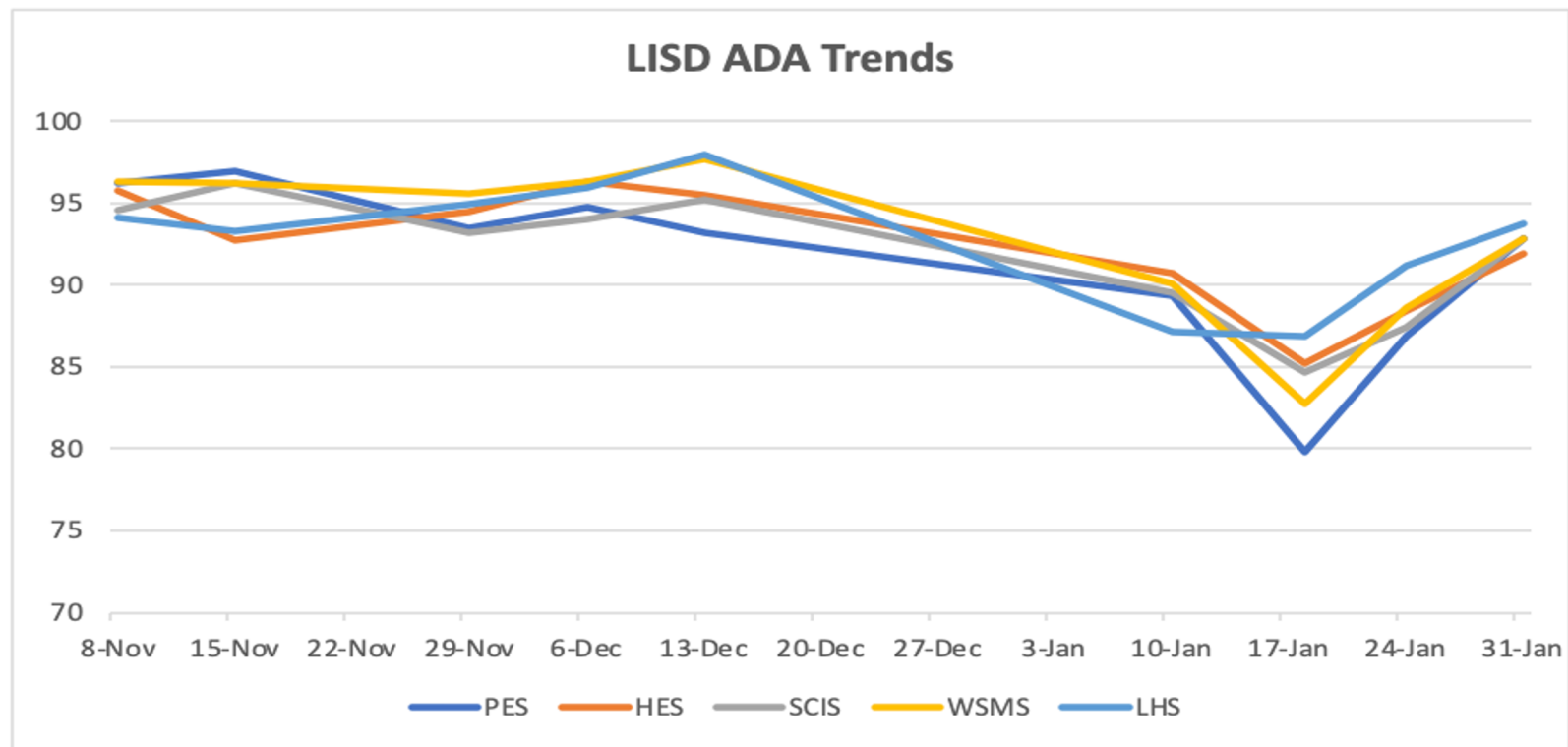
**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT  

---

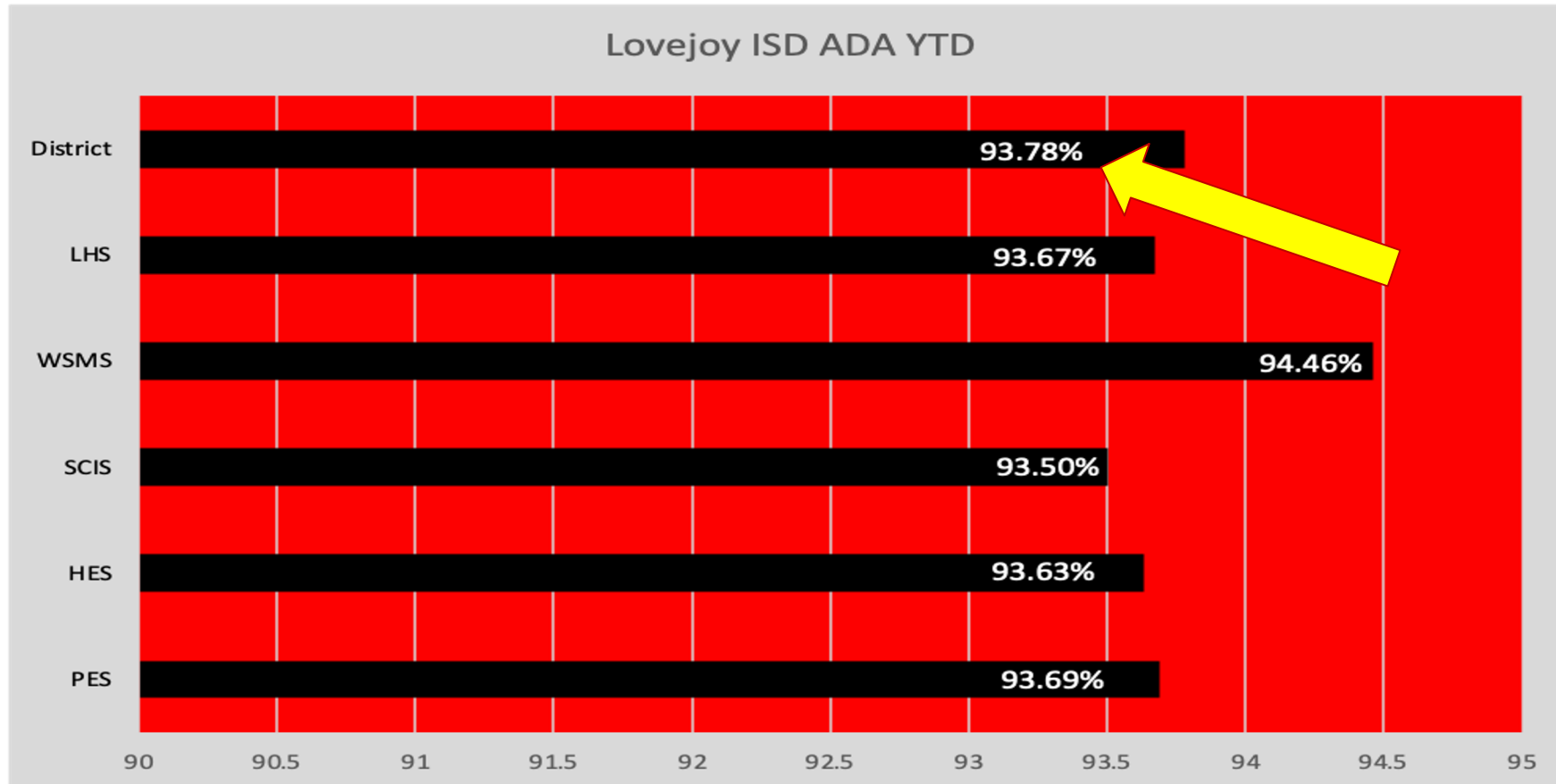
**EST. 1917**

# Attendance Update

---



# Attendance Update



# Financial Implications

---

- No Hold Harmless Allowable in 2021-22 per Legislature
- Initial Projected Loss of \$529,760 Due to Lower Enrollment/ Attendance

	Enrollment	% Attendance	ADA
Budget	4,374	97%	4,243
To TEA			4,165
Projected	4,330	96% (currently @ 94%)	4,167
Difference	44		86
<b>\$529,760 Basic Allotment Loss Dependent on State Action</b>			

# Financial Implications

## Texas School Finance Update

### Attendance Waivers

TEA has posted correspondence that details some additional assistance they will be providing for districts that had low **percentage attendance rates** during the first six weeks period of the 2021-2022 school year. Effectively, the Agency will adjust ADA upwards if necessary in the first six weeks period so that you will have an ADA student count as if the attendance rate were the lesser of the following:

- the rate from the first six weeks period of the 2019-2020 school year, or
- the average of the final three six weeks periods of the 2021-2022 school year.

Note that this will not hold a district harmless against enrollment declines, but could help with higher than normal absence rates among those students who were enrolled during first six weeks, particularly if attendance rates recover to more normal rates during the final three six weeks periods of the year.

Because of this attendance rate hold harmless, TEA will not be granting low attendance waivers for the first six weeks period of the 2021-2022 school year. As of now, there is no attendance rate hold harmless for the remainder of the school year, but low attendance waivers will be available for the other five six weeks periods so that you can apply to have certain low attendance days excluded from the calculation of ADA. Remember that all minutes waivers (including low attendance, staff development, and missed school days waivers) are subject to a cap of 4,200 minutes.

- 1<sup>st</sup> 6 Week Attendance Rate 2021-2022: 94.4%
- Operational Minute Minimum Adjustment Would be Calculated using a TPAR, which would be the lower of:
  - 1<sup>st</sup> 6 Week Attendance Rate 2019-2020: 97.9%
  - Last 18 Week Attendance Rate of 2021-2022**
- Last 18 Week Attendance Rate 2020-2021: 95.9%
- Last 18 Week Attendance Rate This Year will be Critical to Achieve this Adjustment**

\*\*\*will apply attendance rate adjustment to minutes, not to enrollment; no Hold Harmless for enrollment

# Financial Implications

---



- Stood to gain \$70,000 of \$529,760 from 1st 6 weeks TPAR Adjustment if maintained historic last 18-week attendance
- At current enrollment and 94% ADA, loss could be over \$450-900k lower than submitted to state and budget
- TEA: “We will have to do something else.”



THANK YOU

13. Lovejoy 2030 Strategic Planning Update

**Presenter:** Katie Kordel, Superintendent of Schools

Strategic Planning  
Update  
February 7, 2022



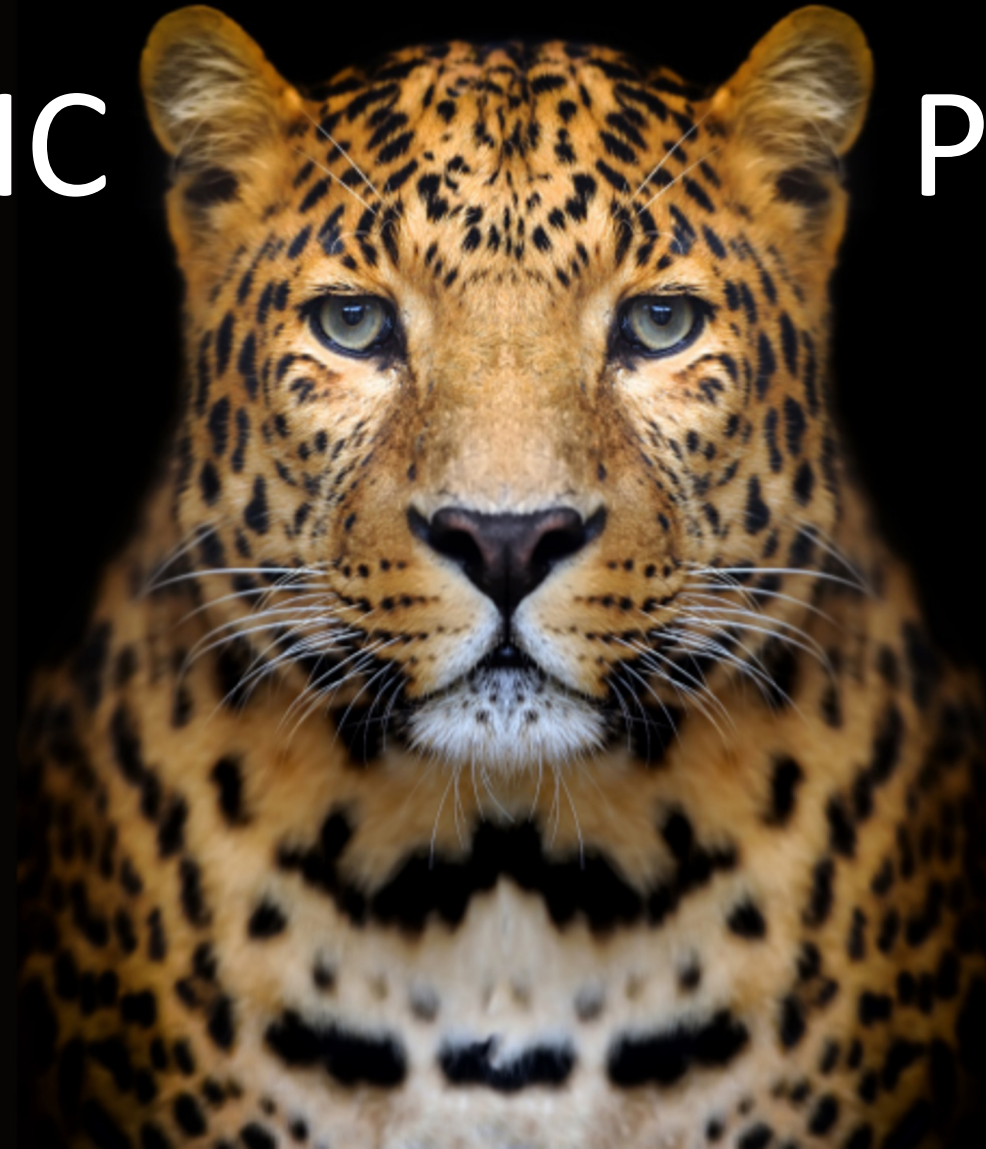
**LOVEJOY 2030**

TOGETHER FOR OUR FUTURE

# LOVEJOY 2030

STRATEGIC

PLANNING



*Excellence  
by Design*

# LOVEJOY 2030

There is  
only one  
**Lovejoy...**



and we  
are all  
**Leopards.**

# LOVEJOY 2030

Grounded in the Lovejoy ISD Mission, Core Values, and Graduate Profile LOVEJOY 2030 is our community-based strategic planning initiative aimed at taking Lovejoy ISD to the next level.



The LOVEJOY 2030 Strategic Planning Committee will focus on championing Lovejoy ISD's legacy of excellence, supporting future ready students, and achieving financial sustainability.

LOVEJOY 2030  
Strategic Planning  
Committee

Teaching &  
Learning

Graduate Profile

Legacy of  
Excellence

Financial  
Sustainability

Operations

Future Ready

Talent Acquisition,  
Retention, &  
Support

Financial  
Sustainability  
Committee

## Products

Future Ready Skills

Strategic Targets

Strategies

Key Indicators



**LOVEJOY 2030**



# LOVEJOY 2030

Strategic Plan Components	Working Groups	Timeline
Mission	Teaching & Learning	<b>LOVEJOY 2030 Committee Meetings (8:30 a.m. to 3:30 p.m.) Friday, February 11, 2022 Monday, March 21, 2022 Meeting #3 TBD</b>  <b>LOVEJOY 2030 Strategic Plan Presented to Board: May 2022</b>
Core Values	Graduate Profile	
Graduate Profile	Legacy of Excellence	
Future Ready Skills	Financial Sustainability	
Strategic Targets	Operations	
Strategies	Future Ready	
Key Indicators	Talent Acquisition, Retention, & Support	



**LOVEJOY 2030**

# Strategic Planning Principles

Throughout the strategic planning process, our focus will be on student learning and student opportunity we will be cautious not to be short-sighted in the long-term impact of our decisions.

A successful strategic planning process, will result in a sustainable plan aligned with Lovejoy ISD's mission: To Propel every person to personal excellence.

The strategic planning process will seek inspiration and direction from our three district focus areas:

- Legacy of Excellence
- Future Ready Students
- Financial Sustainability

Lovejoy ISD will build support and investment in this initiative with staff, students, and the community by listening, encouraging input, and maintaining transparency.



# LOVEJOY 2030

## Strategic Planning Priorities



**COMMIT TO FURTHERING  
OUR LEGACY OF  
EXCELLENCE, PREPARING  
FUTURE READY  
STUDENTS, AND  
ACHIEVING FINANCIAL  
SUSTAINABILITY**



**PROVIDE A SAFE, SECURE,  
AND WELL-MAINTAINED  
LEARNING ENVIRONMENT**



**RECRUIT, RETAIN, AND  
SUPPORT AN EFFECTIVE  
TEACHER IN EVERY  
CLASSROOM AND AN  
EFFECTIVE PRINCIPAL IN  
EVERY SCHOOL**



**ENSURE ALIGNMENT  
WITH OUR CORE  
RESPONSIBILITY BY  
GUIDING AND  
SUPPORTING HIGH LEVELS  
OF LEARNING FOR EVERY  
LOVEJOY ISD STUDENT**



**CONTINUE TO MAXIMIZE  
STUDENT OPPORTUNITIES  
AND FULFILL OUR  
COMMITMENT TO THE  
LOVEJOY ISD GRADUATE  
PROFILE**

# Timeline, Process, & Products

## Meeting #1

**Friday, February 11, 2022**

- 01 Introduction to LOVEJOY 2030
- 02 Role of LOVEJOY 2030 Stakeholder Committee
- 03 Business, Industry, and Educational Leader Panel
- 04 Identify Essential Future Ready Skills
- 05 Student Panel
- 06 Define Future Ready Skills

## Meeting #2

**Monday, March 21, 2022**

- 01 Engage with Lovejoy ISD Focus Areas
- 02 Examine Current State and Research Base
- 03 Examine Strengths, Weaknesses, Opportunities, and Threats
- 04 Define Scope of Strategic Targets
- 05 Create Strategic Targets
- 06 Develop Strategies

## Meeting #3

**TBD**

- 01 Polish Strategic Targets and Strategies
- 02 Provide Feedback to Other Working Groups
- 03 Determine How We Will Measure Our Progress
- 04 Strategic Target, and Strategy Alignment
- 05 Review Scorecards
- 06 Discuss What Comes Next
- 07 Celebrate our Accomplishments!

# Product: Scorecard Example

Goal Area	FUTURE READY	
Strategic Target 1	<p style="text-align: center;"><b>Lovejoy ISD will develop academic programs and learning opportunities to equip students, district staff, and parents with skills to support the growth of responsible digital citizens.</b></p>	
	Strategy	Key Indicators
Strategy 1.1	<p>Increase learning opportunities for students and parents regarding digital citizenship and managing personal digital footprints</p>	<p>A) List of learning opportunities for students and parents            B) Attendance at learning opportunities            C) Participant feedback  <i>Person(s) Responsible: Jennifer Duplessis and Laurie Tinsley</i></p>
Strategy 1.2	<p>Provide learning opportunities for students, parents, and district staff on digital citizenship, safety, and responsibility</p>	<p>A) List of learning opportunities for staff            B) Attendance at learning opportunities            C) Participant feedback  <i>Person(s) Responsible: Jennifer Duplessis and Laurie Tinsley</i></p>
Strategy 1.3	<p>Develop student skills and strategies to evaluate technology resources and digital information used in learning for credibility</p>	<p>A) Inclusion in curriculum documents            B) Artifacts of student learning  <i>Person(s) Responsible: Laurie Tinsley</i></p>

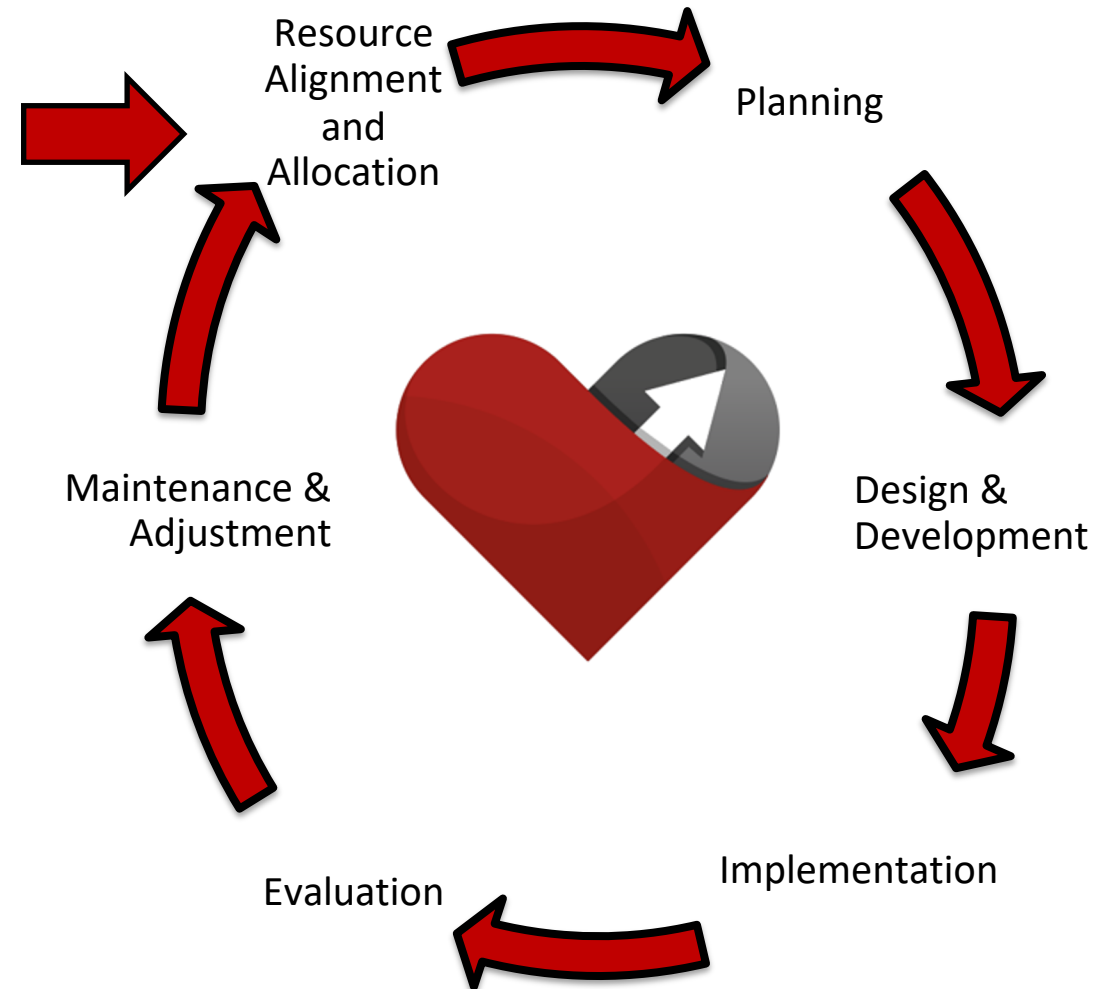
Lovejoy ISD Leadership:  
Development of Strategic Focus Areas  
Represented by our 7 Working Groups

Lovejoy 2030  
Strategic Plan

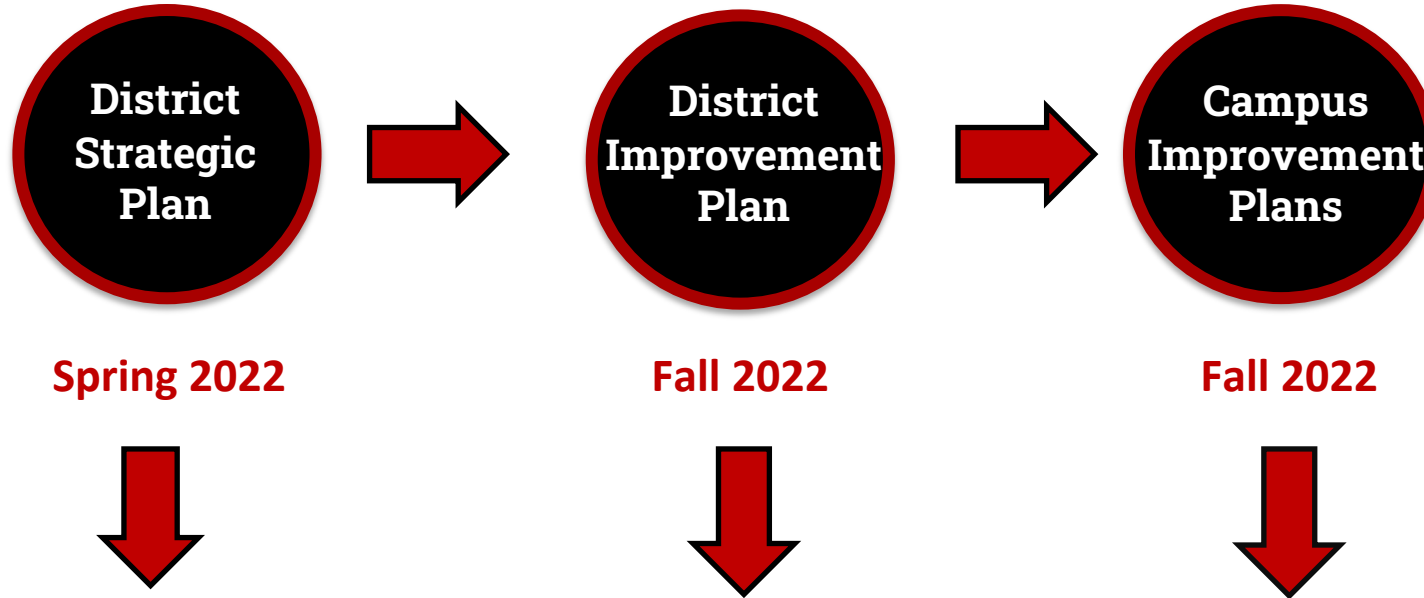
LOVEJOY 2030 Strategic Planning  
Committee: External and Internal  
Stakeholder Input

- Students
- Teachers
- Staff
- Parents/Community
- District and Campus Leaders

# Strategic Planning Process



# Strategy to Implementation



**Achievement of Lovejoy ISD's Goals**



**LOVEJOY 2030**

**Thank  
You**



**LOVEJOY 2030**

TOGETHER FOR OUR FUTURE

14. Lovejoy Scholars Timeline

**Presenter:** Katie Kordel, Superintendent of Schools

# Lovejoy Scholars Timeline

---

**KATIE KORDEL**  
SUPERINTENDENT OF SCHOOLS

**BOARD WORKSHOP**  
FEBRUARY 7, 2022



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT  

---

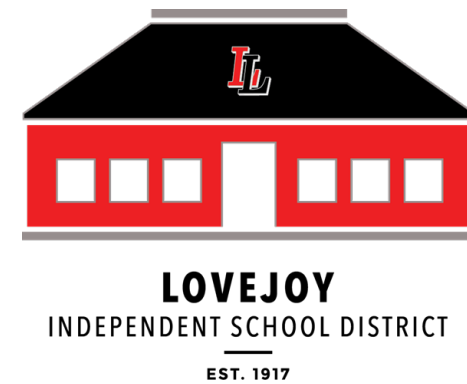
**EST. 1917**

# Lovejoy Scholars Program

Lovejoy Scholars is a limited application-based enrollment program for students living outside of the Lovejoy ISD boundaries.

Current criteria for enrollment includes, but is not limited to:

- 95% attendance for each class for the 2020-2021 and 2021-2022 school years and no excessive tardies
- Passing all classes for the 2020-2021 and 2021-2022 school years
- Students from home school, private school, non-accredited school, or school outside of Texas, must show satisfactory scores on standardized achievement test and/or successful achievement on district delivered academic test
- No serious infractions on the disciplinary record for the 2020-2021 and 2021-2022 school years
- Compliance with the LISD Student Code of Conduct, Parent Code of Conduct, district policies and regulations, and expectations for behavior of the student and/or parent(s)



# Considerations for 2022-2023

- Updated Demographic Report
  - Establish a Maximum Number of Lovejoy Scholars for 2022-2023 Enrollment
- New Students
  - Application Fee
  - Tuition Rate
    - K-6
    - 7-12
- Existing Lovejoy Scholars (2021-2022 School Year)
  - Annual review to ensure alignment with the established criteria for continuing enrollment in 2022-2023
  - Establish Annual Review and Renewal Fee



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT  
EST. 1917

# Tuition

---

2013-  
2014

\$8,000 K - 6  
\$10,000 7 - 12

2017-  
2018

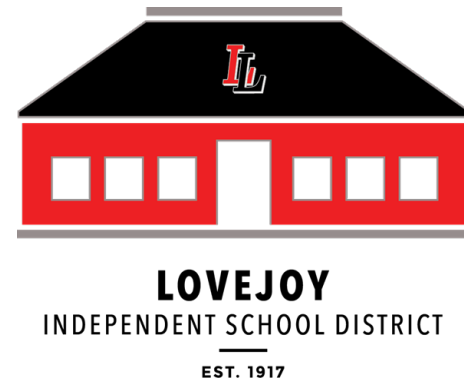
\$9,000 K - 6  
\$11,000 7 - 12

2021-  
2022

Application Fee  
\$150

# Timeline for Lovejoy Scholars

- **February 7, 2022 Updated Demographic Report**
- **March 14, 2022 Board Workshop**
  - Detailed Proposal
- **March 28, 2022 Regular Board Meeting**
  - Consideration and Action on Lovejoy Scholars Program





THANK YOU

15. Consider and Act on the High School Detention Pond Improvements

**Presenter:** Dr. Jennifer DuPlessis, Assistant Superintendent of Finance and Operations



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT  
EST. 1917

## Lovejoy Independent School District Board of Trustees

<b>Date of Meeting</b>	February 7, 2022
<b>Document Title</b>	High School Detention Pond Improvements
<b>Presented For</b>	<input checked="" type="checkbox"/> Board Action <input type="checkbox"/> Report/Review Only
<b>Supporting Documents</b>	<input type="checkbox"/> None <input checked="" type="checkbox"/> Attached <input type="checkbox"/> Provided Later
<b>Administrator Responsible</b>	Jennifer DuPlessis, Ph.D. Assistant Superintendent of Finance and Operations

### Executive Summary

Before Lovejoy High School was built, there was some existing flooding to neighboring properties in the area. To mitigate any additional flooding due to the construction of the High School, the District was required to include a detention pond in the construction plan. Over time, the detention pond barrier has flattened and needs to be built up again. It has also been proposed that additional concrete work and an outfall basin be included so that the structure better manages drainage volumes. The District and City's engineers have assessed the situation and provided findings indicating the District is responsible for making improvements to restore the property condition to similar levels of water retention prior to construction.

Due to the existing athletic work conducted at the high school, excess dirt was available for relocation to the needed areas for the detention pond to restore some areas, minimizing additional cost to the District to address drainage needs. The remaining cost is \$10,700 and the District is proposing to authorize Hellas to complete this work while they are still on site to minimize cost to the District. Bond funds would be utilized to cover the cost of this project.

**Fiscal Implications**

The \$10,700 of remaining cost to the District would be funded by bond funds.

**Administrator Recommendation**

It is the recommendation of the Administration that the Board of Trustees approve the Lovejoy High School detention pond improvements as presented.

**Board Priority**

**Priority 3**

Lovejoy ISD will use established measures to evaluate all areas which impact the student experience. A sustained focus on continual improvement in all aspects of district services remains a constant with the continued goal of providing the highest quality of learning experiences for our students.

**Priority 4**

Lovejoy ISD will develop stronger community connections and confidence through effective communication with both internal and external stakeholders.

**Priority 5**

Lovejoy ISD will continuously examine and analyze the best practices of implementation for safety and security; enhancing safety and protecting the positive learning environment and by ensuring the personal/social needs of Lovejoy students are addressed.



January 18, 2022

Chris Ross  
Athletic Director  
Email: [chris\\_ross@lovejoyisd.net](mailto:chris_ross@lovejoyisd.net)  
Lovejoy ISD

Jennifer DuPlessis, Ph.D.  
Assistant Superintendent of Finance and Operations  
[jennifer\\_duplessis@lovejoyisd.net](mailto:jennifer_duplessis@lovejoyisd.net)  
Lovejoy ISD

RE: Lovejoy HS Facility Renovations **PCO #3 Detention Pond Improvements on East Side**

**Hellas Construction, Inc.** is pleased to provide this Scope of Work and Proposal for the above referenced project. Drawings provided by City of Lucas on 12/1/21

**Hellas** scope of work/options:

1. Place native fill material along existing detention berm.
2. All disturbed area to be seeded with common Bermuda .
3. Remove existing sloped end headwall, connect to the existing 36" RCP.
4. Install new detention basin outfall structure.

**Total for This CO: \$10,700.00**

Notwithstanding anything to the contrary in any of the Contract documents, under no circumstances shall the Performance bonds, maintenance bonds or the obligations of the Surety be liable for any warranty obligations that exceed 1 year from the date of substantial completion as defined in the Contract documents.

A handwritten signature in blue ink, appearing to read "Alex Martinez", is written over a horizontal line.

Alex Martinez  
Project Manager



**BIRKHOFF, HENDRICKS & CARTER, L.L.P.**  
**PROFESSIONAL ENGINEERS**

11910 Greenville Ave., Suite 600

Dallas, Texas 75243

Phone (214) 361-7900

www.bhcllp.com

JOHN W. BIRKHOFF, P.E.  
GARY C. HENDRICKS, P.E., R.P.L.S.  
JOE R. CARTER, P.E.  
MATT HICKEY, P.E.  
ANDREW MATA, JR., P.E.

DEREK B. CHANEY, P.E., R.P.L.S.  
CRAIG M. KERKHOFF, P.E.  
JUSTIN R. IVY, P.E.  
JULIAN T. LE, P.E.  
COOPER E. REINBOLD, P.E.

December 2, 2021

Mr. Scott Holden, P.E.  
Public Works Director  
City of Lucas  
665 Country Club Road  
Lucas, Texas 75002

Re: Lemontree and Kingswood Drainage Design

Dear Mr. Holden:

As requested, we prepared the Engineer's Opinions of Probable Construction Cost (EOPCC) for Recommendations 4, 5, and 6 that are described in the Executive Summary for the Lemontree and Kingswood Drainage Design project. We attached two (2) copies of each EOPCC to this letter.

The following lists the recommended order of completion for the recommended projects follows with a brief explanation for the placement in the order, as requested:

1. Recommendation 1 – Claremont Springs Retention/Detention Pond for Phase 1.  
City staff indicates the HOA will raise the embankment around the detention/retention pond at no cost to the City. This will alleviate the potential for the pond overtopping during a 100-year event.
2. Recommendation 2 – Future Farmstead Retention/Detention Pond  
The developer indicated willingness to oversize the retention/detention pond to help alleviate flooding issues. City staff indicates the larger retention/detention pond will be at HOA no cost to the City. This will mitigate some or all of the slight increase in flow from south of Estates Parkway.
3. Recommendation 3 – Lovejoy High School Detention Pond  
The engineer for Lovejoy ISD indicated that the school district intends to make modifications to the existing detention pond including modifying the outfall structure and raising the embankment at no cost to the City. This will allow the pond to function as intended and increase the effectiveness during more frequent rainfall events.
4. Recommendation 5 – Orchard Road Crossing at Outfall from Rimrock  
The property owners expressed a willingness to cooperate with the City to improve the channel and the culverts crossing Orchard Road from the property line at the outfall from Rimrock to the east end of the Lemontree Addition. The conceptual design for these improvements includes rock riprap at the west property line (outfall from Rimrock) and a deeper channel with a 6-foot bottom and 8:1 side slopes to a new three barrel 3'h x 5'w box culvert crossing Orchard Road and a deeper channel with a 6-foot bottom and 8:1 side slopes to outfall near the elevation of the channel just east of Lemontree. This project will mitigate most of the current problems in the area of the existing channel.

5. Recommendation 4 – Rimrock Detention Pond

The embankment along the common property line between the Rimrock development and the Lemontree Addition needs to be raised. The conceptual design includes a total of approximately 900 linear feet of additional embankment averaging approximately 10 to 12 -inches in height with rock rip rap on the west side (towards Rimrock) and block sod on the top and east sides. This project will mitigate overtopping during larger storm events and allow pond to function as intended during 100-year events.

6. Recommendation 6 – Lynn Lane Crossing Reid Branch Tributary 1

The existing culverts at Lynn Lane provide capacity for the 5-year frequency storm without overtopping the road. The City requested that any improvement be limited to not exceed the capacity of the existing two 8'h x 10' w culverts downstream at Country Club Road. This limits the maximum area to 160 square feet. The proposed model uses three 5'h x 10' wide culverts to avoid significantly raising Lynn Lane at the crossing and stay with standard size box culverts. This project increases the capacity to pass a 10-year event; however, the 25-year event overtops the road. The 100-year culvert size would require raising Lynn Lane and would be larger than the existing culverts at Country Club Road.

The final report will include recommended improvements to the channels and culverts in the Lemontree Addition and to channels through the Kingswood Addition to provide adequate capacity and allow runoff to be conveyed more efficiently to reduce potential flooding concerns.

Let us know if there are any questions regarding our recommendations. We are available to discuss this report and our recommendations at your convenience.

Sincerely,



Joe R. Carter, P.E., CFM

Enclosures

Client: CITY OF LUCAS, TEXAS  
 Project: LEMONTREE & KINGSWOOD DRAINAGE DESIGN  
ORCHARD ROAD SOUTH CULVERT AND CHANNEL

Date: 2-Dec-21  
 By: JRC

**ENGINEER'S OPINION OF CONSTRUCTION COST**

Item No.	Description	Quantity	Unit	Price	Amount
1	Mobilization (at 5% Maximum All Other Items)	1	L.S.	\$ 13,700.00	\$ 13,700.00
2	Prepare Right-of-Way, Clearing and Grubbing	5.5	Sta.	\$ 2,400.00	\$ 13,200.00
3	Unclassified Channel Excavation	1,561	C.Y.	\$ 25.00	\$ 39,025.00
4	Remove Reinf. Concrete Pavement	67	S.Y.	\$ 25.00	\$ 1,675.00
5	Remove Existing 2 - 21" CMP and Headwalls	1	L.S.	\$ 2,200.00	\$ 2,200.00
6	12" to 18" Rock Riprap	408	S.Y.	\$ 200.00	\$ 81,600.00
7	Block Sod	2,622	S.Y.	\$ 7.00	\$ 18,354.00
8	Three 5's x 3'r Box Culverts	40	L.F.	\$ 1,650.00	\$ 66,000.00
9	Type PW Headwalls	2	Ea.	\$ 20,000.00	\$ 40,000.00
10	Construct 6" Flexible Base	67	S.Y.	\$ 30.00	\$ 2,010.00
11	Construct 8" Reinf Concrete Pavement	67	S.Y.	\$ 85.00	\$ 5,695.00
12	Furnish & Install Temporary Erosion Control	1	L.S.	\$ 2,200.00	\$ 2,200.00
13	Remove Temporary Erosion Control	1	L.S.	\$ 1,100.00	\$ 1,100.00
	<b>Subtotal (Without Mobilization) :</b>				\$ 273,059.00
	<b>Subtotal (With Mobilization) :</b>				\$ 286,759.00
	*Drainage and Construction Easements (500' x 60') :	30,000	S.f.	\$ -	\$ -
	Contingencies and Miscellaneous Items :	25%			\$ 71,689.75
	<b>Total :</b>				\$ 358,448.75
	*Surveys and Engineering for Detailed Construction Plans :	20%			\$ -
	* Items Not Included in Cost at Owner's Direction				
	<b>TOTAL WITHOUT EASEMENTS OR DETAILED DESIGN (Rounded Up to Nearest \$10,000) :</b>				\$ 360,000.00

**\*\* DISCLAIMER**

OPINION OF PROBABLE CONSTRUCTION COST IS BASED ON A CONCEPTUAL DESIGN, NOT A DETAILED ENGINEERING DESIGN. THE ACTUAL COST MAY VARY SIGNIFICANTLY DEPENDING ON MANY FACTORS INCLUDING BUT NOT LIMITED TO INFLATION, EASEMENT COST, PHASING AND TEMPORARY ACCESS, TREE MITIGATION, SIZE AND SCOPE OF THE AS BID PROJECT, ENGINEERING AND SURVEYING, WORKING ROOM, MATERIAL AVAILABILITY, UTILITY CONFLICTS, ETC.



Client: CITY OF LUCAS, TEXAS

Date: 2-Dec-21

Project: LEMONTREE & KINGSWOOD DRAINAGE DESIGN  
LYNN LANE CULVERT AND CHANNEL

By: JRC

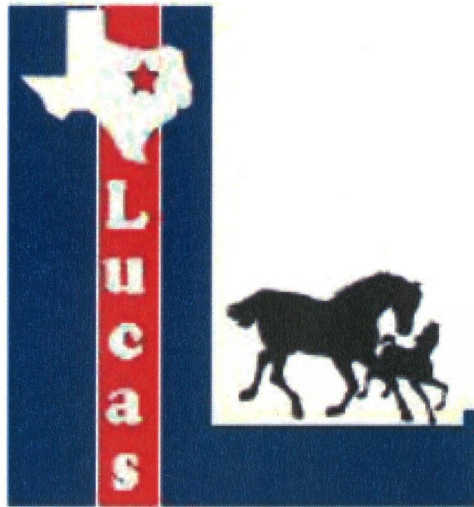
**ENGINEER'S OPINION OF CONSTRUCTION COST**

Item No.	Description	Quantity	Unit	Price	Amount
1	Mobilization (at 5% Maximum All Other Items)	1	L.S.	\$ 18,800.00	\$ 18,800.00
2	Prepare Right-of-Way, Clearing and Grubbing	2.5	Sta.	\$ 2,400.00	\$ 6,000.00
3	Unclassified Channel & Roadway Excavation	400	C.Y.	\$ 25.00	\$ 10,000.00
4	Remove Reinf. Concrete Pavement	200	S.Y.	\$ 25.00	\$ 5,000.00
5	Remove Existing 8 - 48" RCP and Headwalls	1	L.S.	\$ 12,000.00	\$ 12,000.00
6	12" to 18" Rock Riprap	360	S.Y.	\$ 200.00	\$ 72,000.00
7	Block Sod	800	S.Y.	\$ 7.00	\$ 5,600.00
8	Three 10's x 5'r Box Culverts	40	L.F.	\$ 3,600.00	\$ 144,000.00
9	Type PW Headwalls	2	Ea.	\$ 32,000.00	\$ 64,000.00
10	Construct 6" Flexible Base	200	S.Y.	\$ 30.00	\$ 6,000.00
11	Construct 8" Reinf Concrete Pavement	200	S.Y.	\$ 85.00	\$ 17,000.00
12	Furnish & Install T501 Traffic Rail	100	L.F.	\$ 240.00	\$ 24,000.00
13	Construct 5' Wide Reinf Concrete Sidewalk	84	S.Y.	\$ 90.00	\$ 7,560.00
14	Furnish & Install Temporary Erosion Control	1	L.S.	\$ 2,500.00	\$ 2,500.00
15	Remove Temporary Erosion Control	1	L.S.	\$ 1,250.00	\$ 1,250.00
	<b>Subtotal (Without Mobilization) :</b>				\$ 376,910.00
	<b>Subtotal (With Mobilization) :</b>				\$ 395,710.00
	*Drainage and Construction Easements (50' x 150') :	7,500	S.f.	\$ -	\$ -
	Contingencies and Miscellaneous Items :	25%			\$ 98,927.50
	<b>Total :</b>				\$ 494,637.50
	*Surveys and Engineering for Detailed Construction Plans :	20%			\$ -
	* Items Not Included in Cost at Owner's Direction				
	<b>TOTAL WITHOUT EASEMENTS OR DETAILED DESIGN (Rounded Up to Nearest \$10,000) :</b>				\$ 500,000.00

**\*\* DISCLAIMER**

OPINION OF PROBABLE CONSTRUCTION COST IS BASED ON A CONCEPTUAL DESIGN, NOT A DETAILED ENGINEERING DESIGN. THE ACTUAL COST MAY VARY SIGNIFICANTLY DEPENDING ON MANY FACTORS INCLUDING BUT NOT LIMITED TO INFLATION, EASEMENT COST, PHASING AND TEMPORARY ACCESS, TREE MITIGATION, SIZE AND SCOPE OF THE AS BID PROJECT, ENGINEERING AND SURVEYING, WORKING ROOM, MATERIAL AVAILABILITY, UTILITY CONFLICTS, ETC.

**LEMONTREE COUNTRY ESTATES  
AND  
KINGSWOOD ESTATES  
DRAINAGE IMPROVEMENTS STUDY**



*Joe Richard Carter*  
*Jan. 12, 2022*

Prepared By  
Birkhoff, Hendricks & Carter, L.L.P.  
Texas Firm 526  
11910 Greenville Avenue, Suite 600  
Dallas, Texas 75243  
Phone (214) 361-7900 / Fax (214) 461-8390  
January, 2022

**CITY OF LUCAS, TEXAS**  
**LEMONTREE AND KINGSWOOD DRAINAGE DESIGN**

**TABLE OF CONTENTS**

**NARRATIVE**

<b>I.</b>	<b>PURPOSE .....</b>	<b>1</b>
<b>II.</b>	<b>PROJECT LOCATION .....</b>	<b>1</b>
<b>III.</b>	<b>PROCEDURES .....</b>	<b>1 – 4</b>
<b>IV.</b>	<b>RESULTS &amp; OBSERVATIONS .....</b>	<b>4 – 6</b>
<b>V.</b>	<b>SUMMARY .....</b>	<b>6 – 7</b>

**APPENDIX A: HYDROLOGY**

EXHIBIT A-1	OVERALL DRAINAGE AREA MAP
EXHIBIT A-2	LEMONTREE NORTHWEST DRAINAGE AREAS
EXHIBIT A-3	LEMONTREE NORTHEAST DRAINAGE AREAS
EXHIBIT A-4	LEMONTREE SOUTH DRAINAGE AREAS
EXHIBIT A-5	KINGSWOOD DRAINAGE AREAS
EXHIBIT A-6	LEMONTREE AND KINGSWOOD 100-YEAR RUNOFF CALCULATIONS
EXHIBIT A-7	LEMONTREE AND KINGSWOOD 25-YEAR RUNOFF CALCULATIONS
EXHIBIT A-8	HEC-HMS MODEL CORRECTED EXISTING HYDROLOGIC SCHEMATIC
EXHIBIT A-9	HEC-HMS MODEL CORRECTED EXISTING-GLOBAL SUMMARY TABLES

**APPENDIX B: HYDRAULIC DESIGN**

EXHIBIT B-1a	DITCH A-1, A-2 & G DESIGN CALCULATIONS
EXHIBIT B-1b	DITCHES B, C, AND D, BERM D, BCEF, LK & KWE DESIGN CALCULATIONS
EXHIBIT B-1c	ORCHARD ROAD DITCH DESIGN CALCULATIONS
EXHIBIT B-2	LEMONTREE CULVERT DESIGN TABLE

**APPENDIX C: LYNN LANE FLOOD STUDY**

EXHIBIT C-1	HEC-RAS WORK MAP
EXHIBIT C-2	EXISTING CONDITIONS HEC-RAS MODEL REPORT
EXHIBIT C-3	EXISTING CONDITIONS PROFILE PLOT
EXHIBIT C-4	EXISTING CONDITIONS CROSS SECTIONS
EXHIBIT C-5	PROPOSED IMPROVEMENTS HEC-RAS MODEL REPORT
EXHIBIT C-6	PROPOSED IMPROVEMENTS PROFILE PLOT
EXHIBIT C-7	PROPOSED IMPROVEMENTS CROSS SECTIONS
EXHIBIT C-8	HEC-RAS STANDARD TABLE 1 COMPARISON

**City of Lucas, Texas**  
**Lemontree Country Estates and Kingswood Estates**  
**Drainage Design Report**

**I. PURPOSE**

The City of Lucas is aware of drainage problems in the Lemontree Country Estates and Kingswood Estates subdivisions and retained Birkhoff, Hendricks & Carter, L.L.P. to analyze the current drainage systems. This report focuses on the 100-year and 25-year frequency rainfall events. A 100-year frequency event is a rainfall event with a 1% chance (1/100) of being equaled or exceeded every year. A 25-year frequency event has a 4% chance (1/25) of being equaled or exceeded every year. The purposes for this report are as follows:

1. To determine the quantity of storm water runoff in the Lemontree Country Estates and Kingswood Estates subdivisions for the 100-year and 25-year frequency rainfall events.
2. To provide recommendations to the City of Lucas and residents of those subdivisions for improvements to improve the storm water drainage systems in those subdivisions.
3. To analyze the existing Lynn Lane culvert capacity at the Reid Branch Tributary 1 crossing.
4. To make recommendations for improvements to the culverts at Lynn Lane.

Lynn Lane crosses Reid Branch Tributary 1 upstream of the Zone A floodplain shown Flood Insurance Rate Map Panel 48085C0405J, Effective Date June 2, 2009, in Collin County, Texas. The community shown on the map panel is the City of Lucas (Community No.481545).

**II. PROJECT LOCATION**

The Lemontree Country Estates and Kingswood Estates subdivisions are located north of Estates Parkway (F.M. 2170) and west of Country Club Road (F.M. 1378) in the City of Lucas, Collin County, Texas. A Location Map is included as Figure 1 in this report. Both subdivisions contribute flow to Reid Branch Tributary 1, shown on Flood Insurance Rate Map Panel 48085C0405J.

**III. PROCEDURES**

This drainage design report uses rainfall intensities from the iSWM Technical Manual developed by the North Central Texas Council of Governments (NCTCOG) as directed by the City of Lucas. The open channels are designed using a spreadsheet currently used by several municipalities near the City of Lucas. Driveway and street culverts (except at Lynn Lane) were designed using the HY8 program developed by the Federal Highway Administration (FHWA). The culverts at Lynn Lane are designed using the HEC-RAS computer software developed by the US Army Corps of

Engineers. The HEC-RAS method is used for large culvert structures and channels with a large amount of drainage.

### **Hydrologic Calculations**

Hydrology is the determination of the quantity of flow from storm events. The terminology used to describe various events such as 100-year and 25-year are based on probabilities. The term 100-year storm refers to a rainfall event with a probability of 1/100 (1%) that an event equal to or greater will occur each year. The term 25-year storm refers to a rainfall event with a probability of 1/25 (4%) that an event equal to or greater will occur each year.

There was no existing hydrologic model for the drainage area upstream of Lynn Lane crossing Reid Branch Tributary 1. The City of Lucas approved development of a HEC-HMS computer model (developed by the US Army Corps of Engineers) to calculate runoff for the drainage area upstream of Lynn Lane. This computer program is a commonly used for large drainage basins, generally over 200 acres. The total area contributing flow to Reid Branch Tributary 1 upstream of Lynn Lane is approximately 446 acres.

The NRCS Win TR-55 computer model was used to calculate weighted SCS Curves and to calculate the time of concentration for the sub-areas greater than 10-acres in the hydrologic model. A HEC-HMS computer model was used to calculate flows for the 2, 5, 10, 25, and 100-year frequency storm events for the existing conditions. The lag time used in the HEC-HMS model is 60% of the time of concentration from the NRCS Win TR-55 model. The 24-hour rainfall for the various frequency event was taken from the NRCS Win TR-55 standard table for Collin County, Texas. The initial abstraction (amount absorbed) for each sub-area is based on Table X from the iSWM Technical Manual and Hydrologic Class D soils (clay). A Type III SCS Unit Hydrograph was used for the 24-hour storm event. The HEC-HMS model includes the retention and detention ponds in the drainage basin based on the plans provided by the City of Lucas for the Lovejoy High School, Phases 1 and 2 of the Claremont Springs subdivision and the Rimrock subdivision.

The following maps, exhibits, and model output data are included in this report:

- Project Drainage Area Map with Aerial Images and 2007 Contours from NCTCOG
- HEC-HMS Model Schematic
- HEC-HMS Model Global Summary Table for 2, 5, 10, 25, and 100 Year Frequencies

The drainage areas for the street and driveway culverts and roadway ditches in the Lemontree Country Estates subdivision are too small to use the HEC-HMS software. An excel spreadsheet calculated the amount of runoff with the Rational Method based on uses rainfall intensities from the iSWM Technical Manual developed by the North Central Texas Council of Governments (NCTCOG).

## **Hydraulic Calculations**

The HEC-RAS computer program (Version 5.0.3) developed by the US Army Corps of Engineers was used to calculate water surface elevations for the 2, 5, 10, 25, and 100-year frequency flows for the existing conditions and the proposed project conditions at Lynn Lane. The water surface elevations generated by the program show the existing culverts at Lynn Lane do not have adequate capacity for a 10-year (10%) frequency event.

The driveway and street culverts were sized using the HY8 program developed by the Federal Highway Administration (FHWA). The resulting sizes are listed in Appendix B of this report.

### **Existing Conditions HEC-RAS Model**

The existing conditions model includes the channel for Reid Branch Tributary 1 from approximately 300 feet upstream of Lynn Lane to approximately 300 feet downstream of Lynn Lane. The channel and culverts were surveyed to obtain elevation and reach data for the HEC-RAS model. There are currently six 48-inch RCP pipe culverts at Lynn Lane. Field surveys were supplemented by information from NCTCOG 2007 contours when water surface elevations exceeded the highest surveyed elevations.

The beginning water surface elevation (boundary condition) is based on normal depth with an energy slope of 0.01 ft/ft., consistent with the energy slope at the downstream limit of the study.

Manning's "n" values were based on field observations and the engineer's experience in modeling floodplains.

The Existing Conditions Model HEC-RAS report with section and profile plots are included in Appendix C of this report:

### **Proposed Project HEC-RAS Model**

The proposed project model includes minor channel improvements at the upstream and downstream face of the culverts crossing Lynn Lane. The proposed culvert sizes are based on not exceeding the existing culvert capacity for the culverts crossing Country Club Road downstream of Lynn Lane. There are two 8'h x 10'w box culverts currently crossing Country Club Road on Reid Branch Tributary 1. This provides a total opening of approximately 160 square feet. Three 5'h x 10' wide boxes were modeled for the proposed Lynn Lane crossing for a total opening of approximately 150 square feet.

The proposed project does have capacity for the 10-year frequency flow; however, the 25-year and 100-year frequency flows overtop Lynn Lane.

The Proposed Project Model HEC-RAS report with section and profile plots are included in Appendix C of this report:

#### **IV. RESULTS AND OBSERVATIONS**

##### Lemontree Country Estates

There is no record of a drainage design for the Lemontree Country Estates subdivision. The street and driveway culverts in the subdivision do not have adequate capacity for a 25-year rainfall event. Many of the lots in the subdivision were not graded to provide positive drainage resulting in low spots where runoff collects until the water either percolates into the clay soil or evaporates.

This report provides recommendations for a system of proposed channels and culverts in Appendix B designed for a 100-year rainfall event. It is recommended that the improvements be performed as a complete project to have the most impact on improving drainage within the subdivision. Improvements performed by individual property owners may not alleviate the flooding issues and may create additional problems without careful consideration of downstream and upstream impacts.

Side yard ditches are recommended for all lots in the subdivision to be provided with a slope of at least 0.50% from the recommended street channel up to the back of the lot and the lots should be graded to drain to the side yard ditches with a minimum slope of 0.50%. The grading required for each lot will vary depending on existing conditions and the elevations of channels available to drain the side yard ditches.

##### Kingswood Estates

The Kingswood Estates subdivision did not include a drainage design with recommendations for street channels and driveway culverts. The drainage generally flows from the lots to the street and south along the street to the cul-de-sac. There is no clear path for the runoff from the cul-de-sac to the existing side yard swale on the east side of the lot near the south end of Kingswood Drive and the yard is slightly higher than the pavement in the cul-de-sac. It is recommended to provide a concrete flume a minimum of 4 feet in width with a slope of at least 0.50% for a clear path runoff to drain from the end of the cul-de-sac to the eastern side yard ditch.

There are reports of standing water in several areas in the subdivision, usually on the side of the lots. Side yard ditches are recommended for all lots in the subdivision to be provided with a slope of at least 0.50% from the street up to the back of the lot and the lots should be graded to drain to the side yard ditches with a minimum slope of 0.50%. The grading required for each lot will vary depending on existing conditions and the elevation of the street available to drain the side yard ditch.

There is a channel at the southwest corner of Kingswood Estates that conveys a large amount of the runoff from Lemontree Country Estates to a channel south of Kingswood Estates. The channel south of Kingswood Estates is a tributary to Reid Branch Tributary 1. This report includes a recommended channel section in Appendix B with a 0.50% grade to convey the 100-year event.

### Lynn Lane Improvements

Lynn Lane crosses Reid Branch Tributary 1 with eight 48-inch RCP culverts. The existing conditions analysis shows these culverts have capacity to convey the 2-year event. The 10-year event overtops the road at a depth of approximately 1 foot and the 100-year event overtops the road at a depth of approximately 2.5 feet.

The City of Lucas requested that the proposed improvements model not exceed the capacity of the existing culverts downstream of Lynn Lane where Reid Branch Tributary 1 crosses Country Club Road. There are two 8'h x 10'w box culverts currently crossing Country Club Road on Reid Branch Tributary 1. This provides a total opening of approximately 160 square feet. Three 5'h x 10' wide boxes were modeled for the proposed Lynn Lane crossing for a total opening of approximately 150 square feet.

The proposed project does have capacity for the 10-year frequency flow; however, the 25-year event overtops the road at a depth of approximately 1 foot and and 100-year event overtops the road at a depth of approximately 2 feet. The proposed improvements do not convey the 100-year event because of the restricted size due to the culverts downstream; however, the depth of flow is reduced in Reid Branch Tributary 1 by approximately 1.5 feet for the 10-year event, approximately 9-inches for the 25-year event, and 6-inches for the 100-year event. The proposed project will reduce the depth of flow in Reid Branch Tributary 1 upstream of the crossing and could reduce flooding. Exhibits related to the proposed improvements at Lynn Lane are included in Appendix C of this report.

### Property Owner's Input

The City of Lucas contacted property owners and invited them to email the City with comments and photographs of their observations related to drainage problems. Two public meetings were held at the City of Lucas and property owners were invited to provide their input about their observations on drainage problems. Attending the meeting with property owners was the Mayor and City Council, City of Lucas Staff and Joe Carter from Birkhoff, Hendricks, and Carter, L.L.P.

The first meeting included the Lemontree Country Estates property owners and owners provided input and perceptions about the drainage problems and what they felt were sources of the problems. Several citizens indicated that they believed that flows from developments including the Lovejoy High School, the Claremont Estates development, and the Rimrock development have increased the flooding problems in their subdivision. One property owner said that the flooding issues on their lot

had almost entered the house and they hired an engineer that told them to build a berm around their lot. One citizen called into the meeting and said that the drainage problems have existed since she moved to Lemontree over thirty years ago. In her opinion, the problems were made worse by overlays on Orchard Road making the water deeper before it flowed over the road. Another citizen asked to meet individually with City Staff and the design engineer. He proposed several retention/detention ponds to help reduce the quantity of runoff together with berms to divert flow from back yards and some channel improvements. He also said that he was certain the Claremont Springs development was one of the major contributors to flooding in the creek.

The second meeting included the Kingswood Estates property owners and owners provided input and perceptions about the drainage problems. The input was mostly related to standing water in their lots and driveways and at the end of the cul-de-sac. One property owner had provided a video of the water flowing through the channel along the south side of his property and in the channel south of his property and said that these channels do not have capacity for large rain events. Another property owner said that the City cleaning the channel downstream of Lynn Lane had improved the flow in that area but was concerned about rising flood levels.

City of Lucas staff informed Birkhoff, Hendricks, and Carter, L.L.P. that they did not want to include design of detention ponds in the proposed project due to property rights and maintenance issues.

## **V. SUMMARY**

An executive summary was provided separate from this report. The executive summary included recommendations to improve the most dramatic flooding problems. Those recommendations are listed as follows:

1. Raise the top of embankment on the Phase 1 Claremont Springs retention/detention pond from 618.70 to 619.20 (6-inches), to provide approximately 6-inches of freeboard for the 100-year event.
2. Reduce the flow to Reid Branch Tributary 1 by oversizing the future Farmstead detention pond to decrease the flow out of Lemontree by approximately 47 cfs if feasible. This will drop the slight increase from the Claremont Springs development.
3. Lovejoy ISD to construct proposed improvements to the detention pond as submitted to the City of Lucas.
4. Raise the pond top of embankment for the Rimrock detention pond and channel along the property line with Lemontree Country Estates from 619.50 to 620.30 (9.6-inches), to provide approximately 6-inches of freeboard for the 100-year event.
5. The channel from the Rimrock outfall to Orchard Road should have a 6-foot wide bottom with a 4:1 side slope, and a depth of 2.50 feet to provide approximately 6-inches of freeboard. The existing two (2) 21-inch CMP culverts should be replaced with three (3) 5'w x 3' h box culverts for the 100-year design event. The channel downstream (east) of the Orchard Road crossing

should have a 6-foot wide bottom with a 4:1 side slope, and a depth of 2.75 feet to provide approximately 6-inches of freeboard. The report includes a recommended slope for the proposed channel.

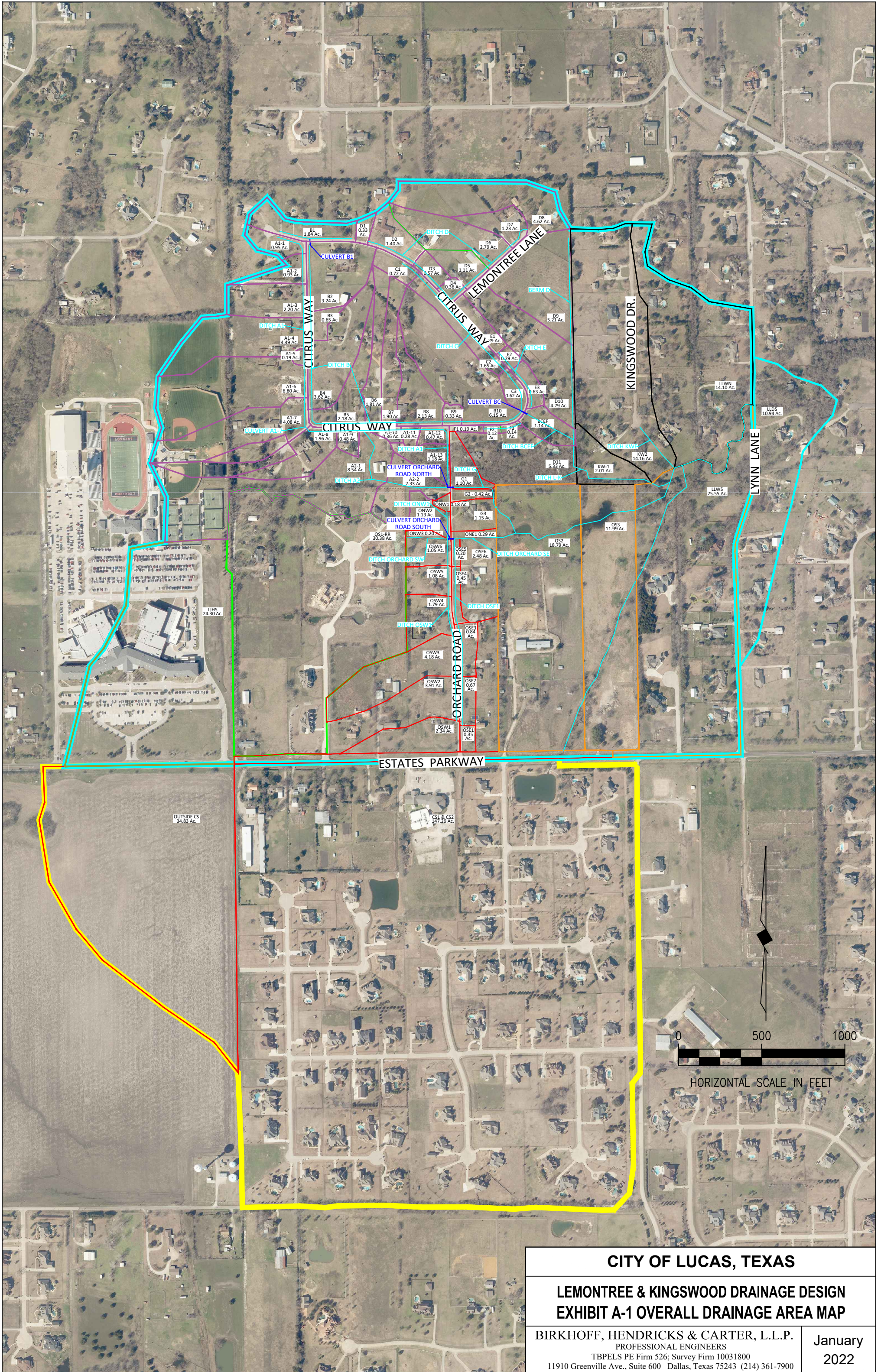
6. Substitute three (3) 10'w x 5'h box culverts for the eight (8) 48-inch RCP culverts. This provides 150 sf of opening to not exceed the capacity downstream at Country Club Road. This provides capacity for the 10-year event, but the 25-year event slightly overtops the roadway. This also lowers the water surface upstream of Lynn Lane by approximately 6-inches during the 100-year event.

The executive summary mentions recommended improvements to reduce localized flooding as "Other Improvements". Those recommendations are described as follows:

7. Construct new driveway and street culverts with roadside ditches in the Lemontree Country Estates development as recommended in the report.
8. Construct improvements the major ditch at the south end of the Kingswood Estates development and grade the cul-de-sac to drain to the side yard ditch on the east side of the cul-de-sac as recommended in the report.

***APPENDIX A***

***HYDROLOGY***

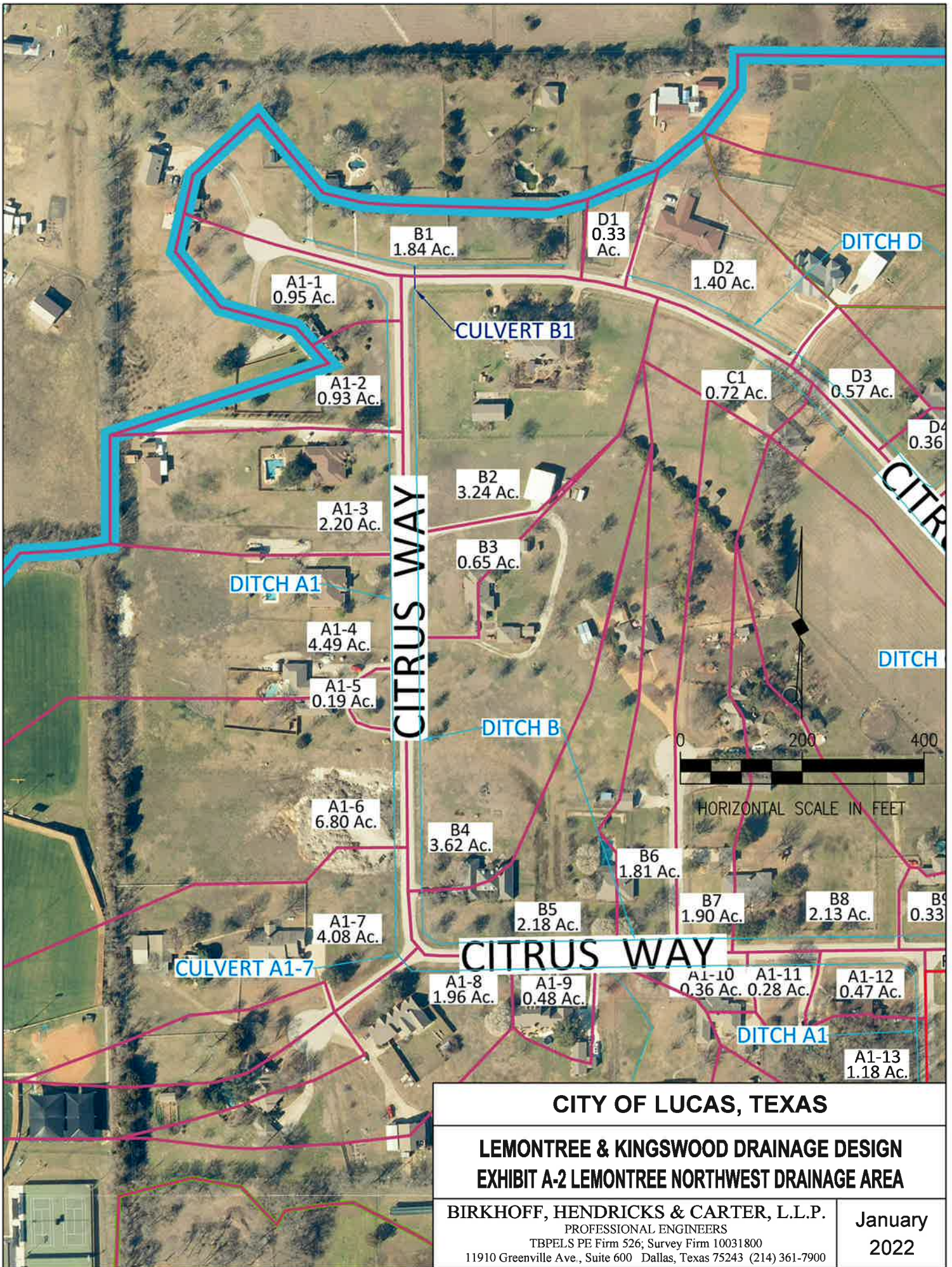


**CITY OF LUCAS, TEXAS**

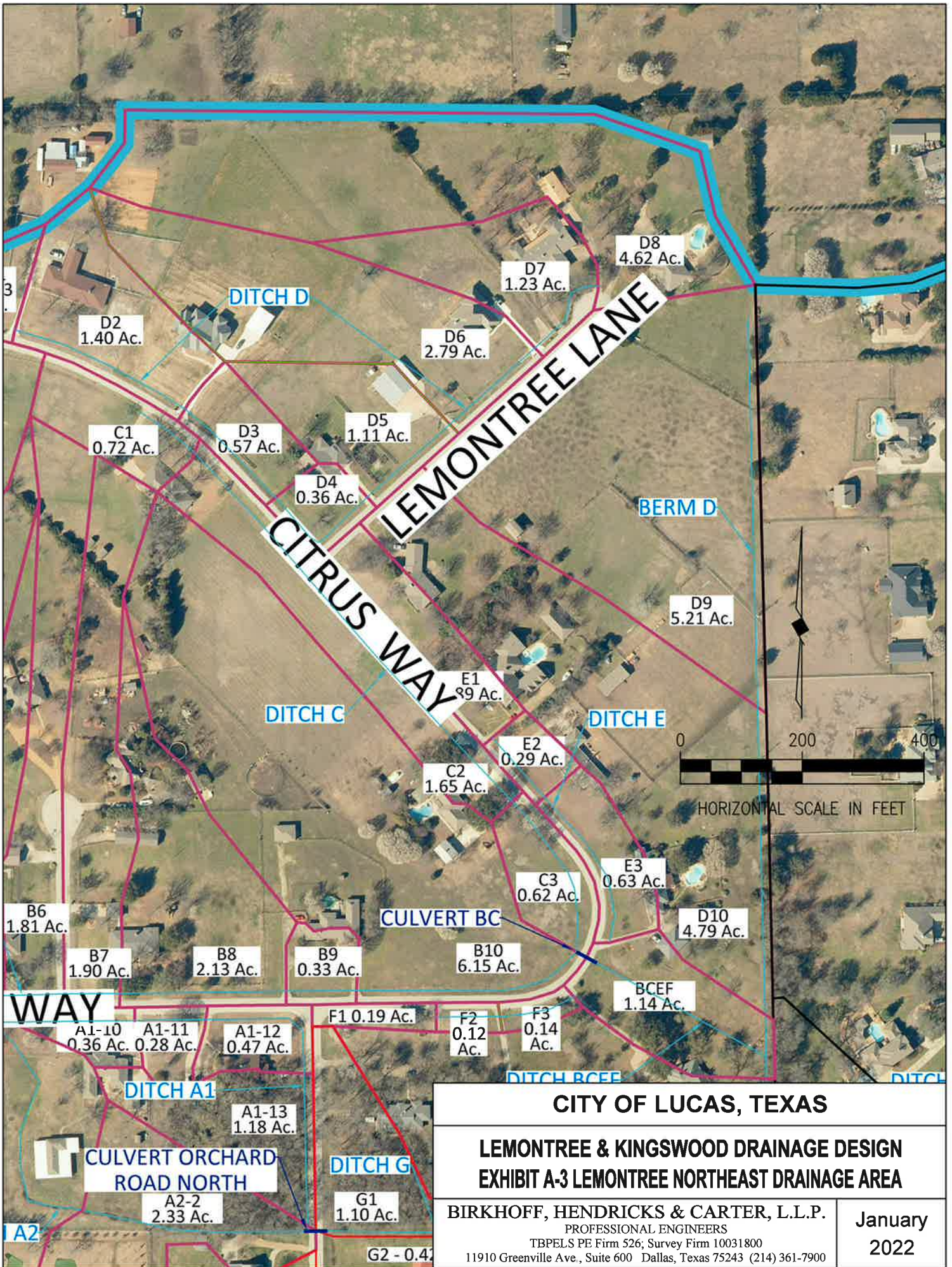
**LEMONTREE & KINGSWOOD DRAINAGE DESIGN  
EXHIBIT A-1 OVERALL DRAINAGE AREA MAP**

BIRKHOFF, HENDRICKS & CARTER, L.L.P.  
 PROFESSIONAL ENGINEERS  
 TBPELS PE Firm 526; Survey Firm 10031800  
 11910 Greenville Ave., Suite 600 Dallas, Texas 75243 (214) 361-7900

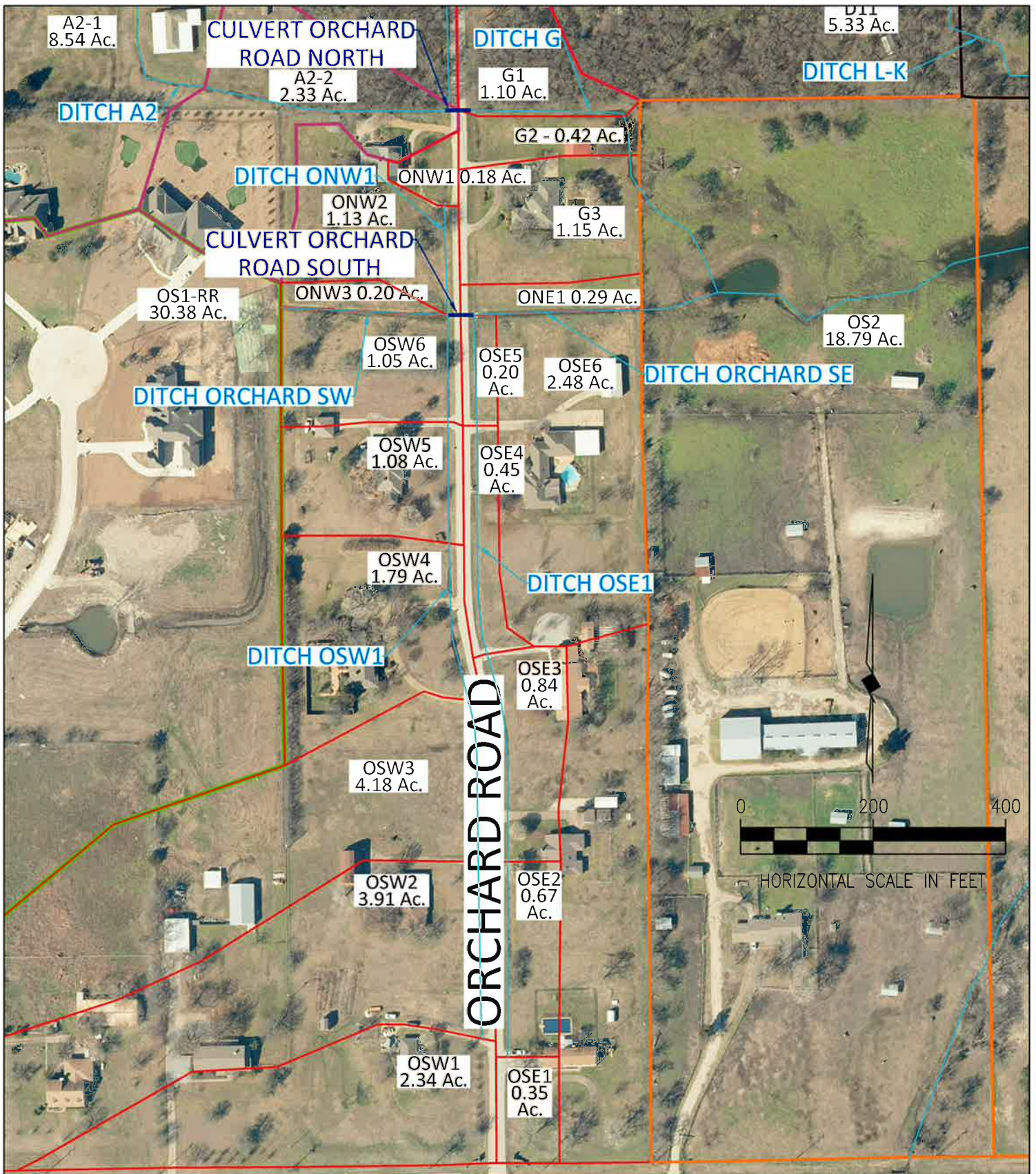
January  
2022



<b>CITY OF LUCAS, TEXAS</b>	
<b>LEMONTREE &amp; KINGSWOOD DRAINAGE DESIGN EXHIBIT A-2 LEMONTREE NORTHWEST DRAINAGE AREA</b>	
BIRKHOFF, HENDRICKS & CARTER, L.L.P. PROFESSIONAL ENGINEERS TBPELS PE Firm 526; Survey Firm 10031800 11910 Greenville Ave., Suite 600 Dallas, Texas 75243 (214) 361-7900	
January 2022	



<b>CITY OF LUCAS, TEXAS</b>	
<b>LEMONTREE &amp; KINGSWOOD DRAINAGE DESIGN EXHIBIT A-3 LEMONTREE NORTHEAST DRAINAGE AREA</b>	
BIRKHOFF, HENDRICKS & CARTER, L.L.P. PROFESSIONAL ENGINEERS TBPELS PE Firm 526; Survey Firm 10031800 11910 Greenville Ave., Suite 600 Dallas, Texas 75243 (214) 361-7900	
January 2022	



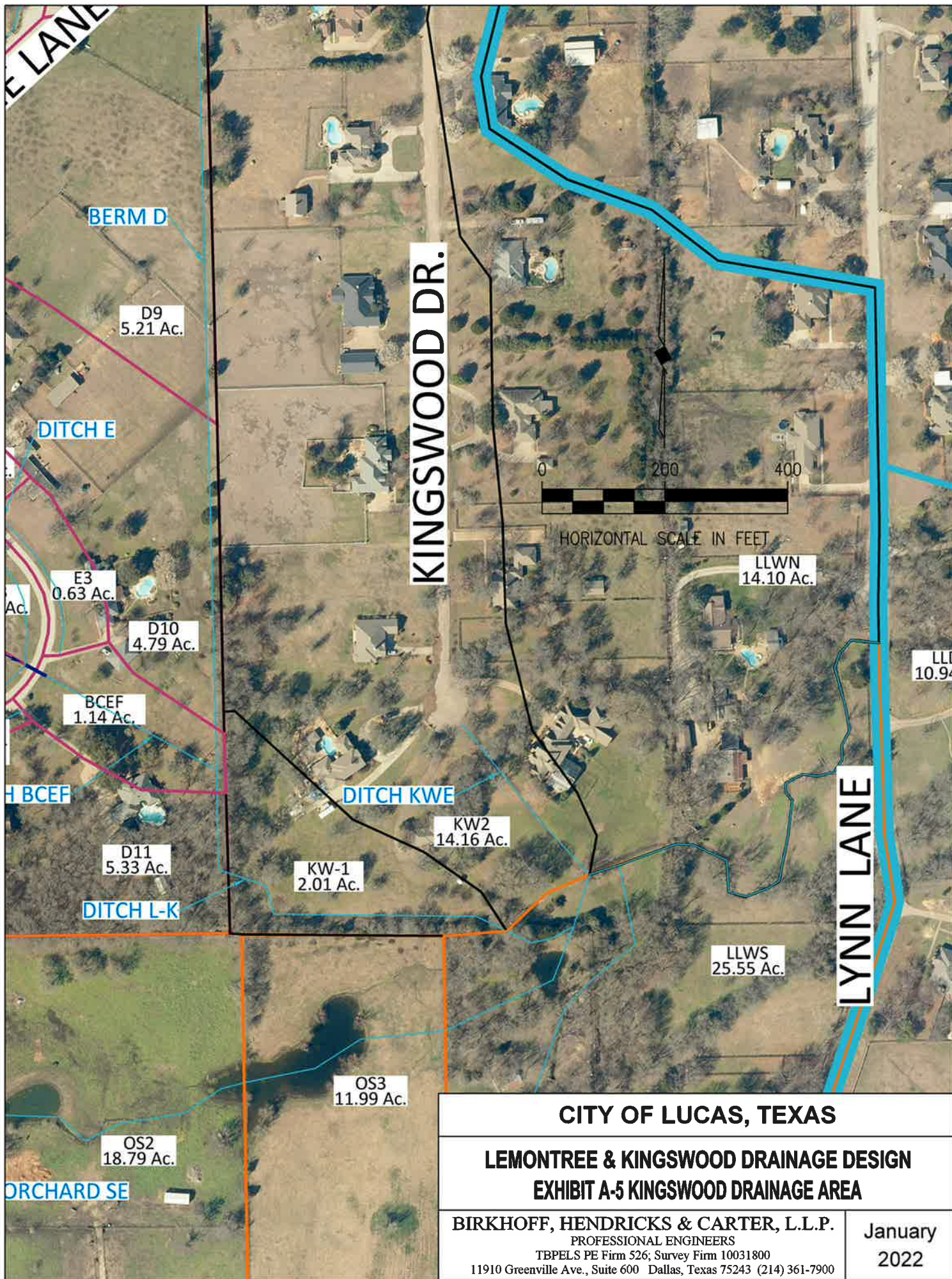
**ESTATES PARKWAY**

**CITY OF LUCAS, TEXAS**

**LEMONTREE & KINGSWOOD DRAINAGE DESIGN  
EXHIBIT A-4 LEMONTREE SOUTH DRAINAGE AREA**

**BIRKHOFF, HENDRICKS & CARTER, L.L.P.**  
 PROFESSIONAL ENGINEERS  
 TBPELS PE Firm 526; Survey Firm 10031800  
 11910 Greenville Ave., Suite 600 Dallas, Texas 75243 (214) 361-7900

January  
2022



**CITY OF LUCAS, TEXAS**

**LEMONTREE & KINGSWOOD DRAINAGE DESIGN  
EXHIBIT A-5 KINGSWOOD DRAINAGE AREA**

**BIRKHOFF, HENDRICKS & CARTER, L.L.P.**  
 PROFESSIONAL ENGINEERS  
 TBPELS PE Firm 526; Survey Firm 10031800  
 11910 Greenville Ave., Suite 600 Dallas, Texas 75243 (214) 361-7900

January  
2022

**EXHIBIT A-6**  
**100-YR. RUNOFF CALCULATIONS**

**Client:** City of Lucas, Texas  
**Project:** Lemontree & Kingswood Drainage Design  
Lemontree Estates

**Date:** 11/18/21  
**By:** JRC

Area No.	Incremental Drainage Area						Incremental "CA"	Accumulated "CA"	Time of Concentration (Min.)	Design Storm Frequency (Yrs.)	Intensity (I) (In./Hr.)	Total Flow (Q) (c.f.s.)
	Total Area (Ac.)	Offsite Area (Ac.)	Offsite Area "C"	Onsite Area (Ac.)	Onsite Area "C"	Effective Runoff "C"						
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>DITCH A-1 (WEST/SOUTH OF CITRUS WAY)</b>												
A1-1	0.95	0.00	0.00	0.95	0.45	0.45	0.43	0.43	10.00	100-yr.	9.20	3.93
A1-2	0.93	0.00	0.00	0.93	0.45	0.45	0.42	0.85	11.51	100-yr.	8.74	7.39
A1-3	2.20	0.00	0.00	2.20	0.45	0.45	0.99	1.84	12.86	100-yr.	8.37	15.37
A1-4	4.49	1.69	0.35	2.80	0.45	0.41	1.85	3.69	13.90	100-yr.	8.11	29.91
A1-5	0.19	0.00	0.00	0.19	0.45	0.45	0.09	3.77	14.46	100-yr.	7.98	30.10
A1-6	6.80	3.35	0.40	3.45	0.45	0.43	2.89	6.67	15.41	100-yr.	7.77	51.77
A1-7	4.08	1.73	0.50	2.35	0.45	0.47	1.92	8.59	16.20	100-yr.	7.60	65.26
A1-7a	0.87	0.00	0.00	0.87	0.45	0.45	0.39	8.98	16.20	100-yr.	7.60	68.23
A1-8a	1.34	0.72	0.50	0.62	0.45	0.48	0.64	9.62	16.37	100-yr.	7.56	72.76
A1-8	1.96	0.00	0.00	1.96	0.45	0.45	0.88	10.50	17.09	100-yr.	7.42	77.92
A1-9	0.48	0.00	0.00	0.48	0.45	0.45	0.22	10.72	17.69	100-yr.	7.31	78.30
A1-10	0.36	0.00	0.00	0.36	0.45	0.45	0.16	10.88	18.79	100-yr.	7.11	77.31
A1-11	0.28	0.00	0.00	0.28	0.45	0.45	0.13	11.00	19.30	100-yr.	7.02	77.23
A1-12	0.47	0.00	0.00	0.47	0.45	0.45	0.21	11.22	20.30	100-yr.	6.85	76.86
A1-13	1.18	0.00	0.00	1.18	0.25	0.25	0.30	11.51	21.42	100-yr.	6.68	76.85
	26.58											
<b>DITCH A2 (SOUTH OF CITRUS TO ORCHARD NORTH CULVERT)</b>												
A2-1	8.54	3.54	0.60	5.00	0.45	0.51	4.37	4.37	15.00	100-yr.	7.86	34.36
A2-2	2.33	0.00	0.00	2.33	0.45	0.45	1.05	5.42	17.04	100-yr.	7.43	40.29
	10.87											
<b>TOTAL FLOW TO ORCHARD CULVERT NORTH (WEST)</b>												
								16.93	21.42	100-yr.	6.68	113.05
<b>DITCH ONW (WEST OF ORCHARD TO ORCHARD CULVERT SOUTH)</b>												
ONW1	0.18	0.00	0.00	0.18	0.45	0.45	0.08	0.08	5.00	100-yr.	11.24	0.91
ONW2	1.13	0.00	0.00	1.13	0.45	0.45	0.51	0.59	7.31	100-yr.	10.17	6.00
<b>DITCH OSW (WEST OF ORCHARD TO ORCHARD CULVERT SOUTH)</b>												
OSW1	2.34	0.00	0.00	2.34	0.45	0.45	1.05	1.05	10.00	100-yr.	9.20	9.68
OSW2	3.91	0.00	0.00	3.91	0.45	0.45	1.76	2.81	11.98	100-yr.	8.61	24.20
OSW3	4.18	0.00	0.00	4.18	0.45	0.45	1.88	4.69	13.44	100-yr.	8.22	38.59
OSW4	1.79	0.00	0.00	1.79	0.45	0.45	0.81	5.50	14.69	100-yr.	7.93	43.58
OSW5	1.08	0.00	0.00	1.08	0.45	0.45	0.49	5.99	15.62	100-yr.	7.72	46.21
OSW6	1.05	0.00	0.00	1.05	0.45	0.45	0.47	6.46	16.42	100-yr.	7.55	48.78
	14.35											
<b>DITCH OSE (WEST OF ORCHARD TO ORCHARD SOUTH (CULVERT))</b>												
OSE1	0.35	0.00	0.00	0.35	0.45	0.45	0.16	0.16	5.00	100-yr.	11.24	1.77
OSE2	0.67	0.00	0.00	0.67	0.45	0.45	0.30	0.46	8.28	100-yr.	9.79	4.50
OSE3	0.84	0.00	0.00	0.84	0.45	0.45	0.38	0.84	11.06	100-yr.	8.87	7.42
OSE4	0.45	0.00	0.00	0.45	0.45	0.45	0.20	1.04	13.80	100-yr.	8.13	8.45
OSE5	0.20	0.00	0.00	0.20	0.45	0.45	0.09	1.13	15.09	100-yr.	7.84	8.85
	2.51											

Client: City of Lucas, Texas  
 Project: Lemontree & Kingswood Drainage Design  
Lemontree Estates

Date: 11/18/21  
 By: JRC

Area No.	Incremental Drainage Area						Incremental "CA"	Accumulated "CA"	Time of Concentration (Min.)	Design Storm Frequency (Yrs.)	Intensity (I) (In./Hr.)	Total Flow (Q) (c.f.s.)
	Total Area (Ac.)	Offsite Area (Ac.)	Offsite Area "C"	Onsite Area (Ac.)	Onsite Area "C"	Effective Runoff "C"						
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>DITCH B (EAST/NORTH OF CITRUS WAY)</b>												
B1	1.84	0.00	0.00	1.84	0.45	0.45	0.83	0.83	10.00	100-yr.	9.20	7.61
B2	3.24	0.00	0.00	3.24	0.45	0.45	1.46	2.29	13.14	100-yr.	8.30	18.97
B3	0.65	0.00	0.00	0.65	0.45	0.45	0.29	2.58	14.24	100-yr.	8.03	20.70
B4	3.62	0.00	0.00	3.62	0.45	0.45	1.63	4.21	16.81	100-yr.	7.48	31.46
B5	2.18	0.00	0.00	2.18	0.45	0.45	0.98	5.19	18.99	100-yr.	7.07	36.69
B6	1.81	0.00	0.00	1.81	0.45	0.45	0.81	6.00	19.52	100-yr.	6.98	41.91
B7	1.90	0.00	0.00	1.90	0.45	0.45	0.86	6.86	20.00	100-yr.	6.90	47.33
B8	2.13	0.00	0.00	2.13	0.45	0.45	0.96	7.82	21.38	100-yr.	6.68	52.24
B9	0.33	0.00	0.00	0.33	0.45	0.45	0.15	7.97	21.94	100-yr.	6.60	52.56
B10	6.15	0.00	0.00	6.15	0.45	0.45	2.77	10.73	23.81	100-yr.	6.34	68.00
	23.85											
<b>DITCH C (SOUTH/WEST OF CITRUS WAY)</b>												
C1	0.72	0.00	0.00	0.72	0.45	0.45	0.32	0.32	10.00	100-yr.	9.20	2.98
C2	1.65	0.00	0.00	1.65	0.45	0.45	0.74	1.07	17.60	100-yr.	7.32	7.81
C3	0.62	0.00	0.00	0.62	0.45	0.45	0.28	1.35	19.83	100-yr.	6.93	9.32
	2.99											
<b>TOTAL FLOW TO CITRUS CULVERT (SOUTHEAST)</b>												
								12.08	23.81	100-yr.	6.34	76.53
<b>DITCH D - BERM (NORTH OF CITRUS/WEST OF LEMONTREE TO BERM AT KINGSWOOD)</b>												
D1	0.33	0.00	0.00	0.33	0.45	0.45	0.15	0.15	5.00	100-yr.	11.24	1.67
D2	1.40	0.00	0.00	1.40	0.45	0.45	0.63	0.78	8.69	100-yr.	9.64	7.51
D3	0.57	0.00	0.00	0.57	0.45	0.45	0.26	1.04	10.34	100-yr.	9.09	9.40
D4	0.36	0.00	0.00	0.36	0.45	0.45	0.16	1.20	11.95	100-yr.	8.61	10.31
D5	1.11	0.00	0.00	1.11	0.45	0.45	0.50	1.70	13.26	100-yr.	8.27	14.03
D6	2.79	0.00	0.00	2.79	0.45	0.45	1.26	2.95	14.51	100-yr.	7.97	23.52
D7	1.23	0.00	0.00	1.23	0.45	0.45	0.55	3.51	15.46	100-yr.	7.75	27.18
D8	4.62	0.00	0.00	4.62	0.45	0.45	2.08	5.58	17.26	100-yr.	7.39	41.26
D9	5.21	0.00	0.00	5.21	0.45	0.45	2.34	7.93	21.69	100-yr.	6.64	52.61
D10	4.79	0.00	0.00	4.79	0.45	0.45	2.16	10.08	25.06	100-yr.	6.17	62.25
	22.41											
<b>DITCH E (EAST OF CITRUS)</b>												
E1	0.89	0.00	0.00	0.89	0.45	0.45	0.40	0.40	5.00	100-yr.	11.24	4.50
E2	0.29	0.00	0.00	0.29	0.45	0.45	0.13	0.53	6.07	100-yr.	10.71	5.69
E3	0.63	0.00	0.00	0.63	0.45	0.45	0.28	0.81	8.38	100-yr.	9.75	7.95
	1.81											
<b>DITCH F (EAST OF CITRUS - EAST OF ORCHARD)</b>												
F1	0.19	0.00	0.00	0.19	0.45	0.45	0.09	0.09	5.00	100-yr.	11.24	0.96
F2	0.12	0.00	0.00	0.12	0.45	0.45	0.05	0.14	5.88	100-yr.	10.80	1.51
F3	0.14	0.00	0.00	0.14	0.45	0.45	0.06	0.20	6.93	100-yr.	10.33	2.09
	0.45											

**Client:** City of Lucas, Texas  
**Project:** Lemontree & Kingswood Drainage Design  
Lemontree Estates

**Date:** 11/18/21  
**By:** JRC

Incremental Drainage Area							Incremental "CA"	Accumulated "CA"	Time of of Concentration (Min.)	Design Storm Frequency (Yrs.)	Intensity (I) (In./Hr.)	Total Flow (Q) (c.f.s.)	
Area No.	Total Area (Ac.)	Offsite Area (Ac.)	Offsite Area "C"	Onsite Area (Ac.)	Onsite Area "C"	Effective Runoff "C"							
1	2	3	4	5	6	7	8	9	10	11	12	13	
<b>DITCH BCEF (SE OF CITRUS TO KINGSWOOD BERM)</b>													
DITCH B								10.73	23.81	100-yr.	6.34	68.00	
DITCH C								12.08	23.81	100-yr.	6.34	76.53	
DITCH E								12.89	23.81	100-yr.	6.34	81.69	
DITCH F								13.10	23.81	100-yr.	6.34	82.97	
BCEF1	1.14	0.00	0.00	1.14	0.45	0.45	0.51	13.61	23.81	100-yr.	6.34	86.22	
<b>DITCH L-K (WEST OF BERM TO SOUTH PROPERTY LINE)</b>													
DITCH D-BERM								10.08	25.06	100-yr.	6.17	62.25	
DITCH BCEF								23.69	25.63	100-yr.	6.10	144.56	
D11	5.33	0.00	0.00	5.33	0.45	0.45	2.40	26.09	26.63	100-yr.	5.98	156.09	
D12	2.01	0.00	0.00	2.01	0.45	0.45	0.90	27.00	28.70	100-yr.	5.75	155.25	
<b>DITCH G (EAST OF NORTH ORCHARD CULVERT)</b>													
DITCH A1+A2								16.93	21.42	100-yr.	6.68	113.05	
G1	1.10	0.00	0.00	1.10	0.25	0.25	0.28	17.21	21.56	100-yr.	6.66	114.54	
G2	0.42	0.00	0.00	0.42	0.45	0.45	0.19	17.40	22.64	100-yr.	6.50	113.04	
G3	1.15	0.00	0.00	1.15	0.45	0.45	0.52	17.92	22.84	100-yr.	6.47	115.88	

**EXHIBIT A-7**  
**25-YR. RUNOFF CALCULATIONS**

Client: City of Lucas, Texas  
 Project: Lemontree & Kingswood Drainage Design  
Lemontree Estates

Date: 11/18/21  
 By: JRC

Incremental Drainage Area							Incremental "CA"	Accumulated "CA"	Time of Concentration (Min.)	Design Storm Frequency (Yrs.)	Intensity (I) (In./Hr.)	Total Flow (Q) (c.f.s.)
Area No.	Total Area (Ac.)	Offsite Area (Ac.)	Offsite Area "C"	Onsite Area (Ac.)	Onsite Area "C"	Effective Runoff "C"						
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>DITCH A-1 (WEST/SOUTH OF CITRUS WAY)</b>												
A1-1	0.95	0.00	0.00	0.95	0.45	0.45	0.43	0.43	10.00	25-yr.	7.55	3.23
A1-2	0.93	0.00	0.00	0.93	0.45	0.45	0.42	0.85	11.77	25-yr.	7.10	6.01
A1-3	2.20	0.00	0.00	2.20	0.45	0.45	0.99	1.84	13.46	25-yr.	6.73	12.35
A1-4	4.49	1.69	0.35	2.80	0.45	0.41	1.85	3.69	15.02	25-yr.	6.42	23.66
A1-5	0.19	0.00	0.00	0.19	0.45	0.45	0.09	3.77	15.73	25-yr.	6.29	23.73
A1-6	6.80	3.35	0.40	3.45	0.45	0.43	2.89	6.67	16.87	25-yr.	6.09	40.60
A1-7	4.08	1.73	0.50	2.35	0.45	0.47	1.92	8.59	17.77	25-yr.	5.95	51.06
A1-7a	0.87	0.00	0.00	0.87	0.45	0.45	0.39	8.98	17.77	25-yr.	5.95	53.39
A1-8a	1.34	0.72	0.50	0.62	0.45	0.48	0.64	9.62	17.77	25-yr.	5.95	57.19
A1-8	1.96	0.00	0.00	1.96	0.45	0.45	0.88	10.50	17.94	25-yr.	5.92	62.16
A1-9	0.48	0.00	0.00	0.48	0.45	0.45	0.22	10.72	18.70	25-yr.	5.80	62.21
A1-10	0.36	0.00	0.00	0.36	0.45	0.45	0.16	10.88	19.41	25-yr.	5.70	62.01
A1-11	0.28	0.00	0.00	0.28	0.45	0.45	0.13	11.00	21.03	25-yr.	5.48	60.31
A1-12	0.47	0.00	0.00	0.47	0.45	0.45	0.21	11.22	22.13	25-yr.	5.34	59.92
A1-13	1.18	0.00	0.00	1.18	0.25	0.25	0.30	11.51	23.32	25-yr.	5.20	59.87
<b>DITCH A2 (SOUTH OF CITRUS TO ORCHARD NORTH CULVERT)</b>												
A2-1	8.54	3.54	0.60	5.00	0.45	0.51	4.37	4.37	15.00	25-yr.	6.42	28.09
A2-2	2.33	0.00	0.00	2.33	0.45	0.45	1.05	5.42	17.11	25-yr.	6.05	32.82
<b>TOTAL FLOW TO ORCHARD CULVERT NORTH (WEST)</b>												
								16.93	23.32	25-yr.	5.20	88.07
<b>DITCH ONW (WEST OF ORCHARD TO ORCHARD CULVERT SOUTH)</b>												
ONW1	0.18	0.00	0.00	0.18	0.45	0.45	0.08	0.08	5.00	25-yr.	9.28	0.75
ONW2	1.13	0.00	0.00	1.13	0.45	0.45	0.51	0.59	7.52	25-yr.	8.31	4.90
<b>DITCH OSW (WEST OF ORCHARD TO ORCHARD CULVERT SOUTH)</b>												
OSW1	2.34	0.00	0.00	2.34	0.45	0.45	1.05	1.05	10.00	25-yr.	7.55	7.95
OSW2	3.91	0.00	0.00	3.91	0.45	0.45	1.76	2.81	12.23	25-yr.	7.00	19.67
OSW3	4.18	0.00	0.00	4.18	0.45	0.45	1.88	4.69	13.74	25-yr.	6.67	31.29
OSW4	1.79	0.00	0.00	1.79	0.45	0.45	0.81	5.50	15.08	25-yr.	6.41	35.23
OSW5	1.08	0.00	0.00	1.08	0.45	0.45	0.49	5.99	16.06	25-yr.	6.23	37.28
OSW6	1.05	0.00	0.00	1.05	0.45	0.45	0.47	6.46	16.91	25-yr.	6.08	39.29
<b>DITCH OSE (WEST OF ORCHARD TO ORCHARD SOUTH (CULVERT))</b>												
OSE1	0.35	0.00	0.00	0.35	0.45	0.45	0.16	0.16	5.00	25-yr.	9.28	1.46
OSE2	0.67	0.00	0.00	0.67	0.45	0.45	0.30	0.46	8.51	25-yr.	7.98	3.66
OSE3	0.84	0.00	0.00	0.84	0.45	0.45	0.38	0.84	11.45	25-yr.	7.18	6.01
OSE4	0.45	0.00	0.00	0.45	0.45	0.45	0.20	1.04	14.33	25-yr.	6.55	6.81
OSE5	0.20	0.00	0.00	0.20	0.45	0.45	0.09	1.13	15.72	25-yr.	6.29	7.10

Client: City of Lucas, Texas  
 Project: Lemontree & Kingswood Drainage Design  
Lemontree Estates

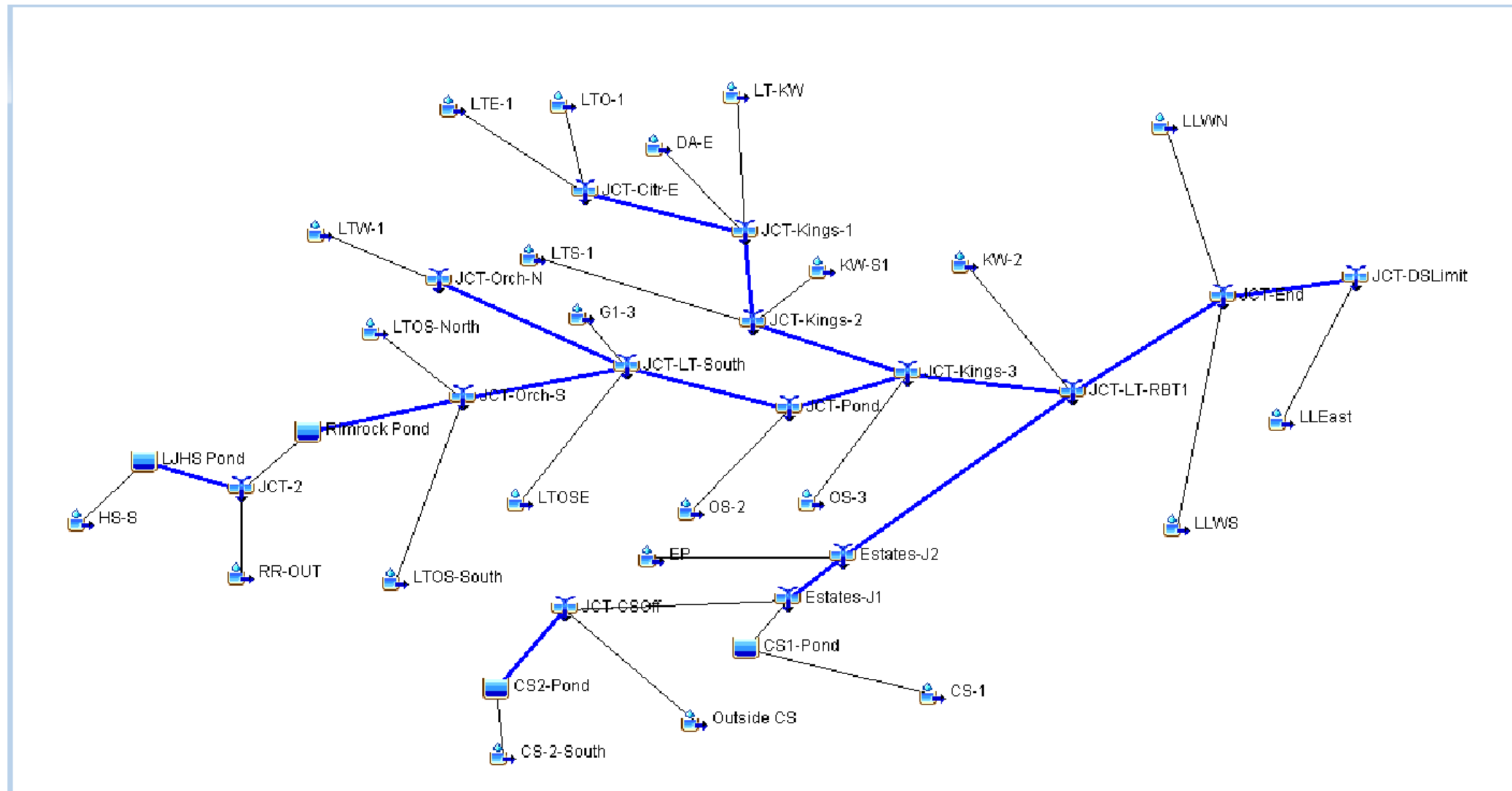
Date: 11/18/21  
 By: JRC

Incremental Drainage Area							Incremental "CA"	Accumulated "CA"	Time of Concentration (Min.)	Design Storm Frequency (Yrs.)	Intensity (I) (In./Hr.)	Total Flow (Q) (c.f.s.)
Area No.	Total Area (Ac.)	Offsite Area (Ac.)	Offsite Area "C"	Onsite Area (Ac.)	Onsite Area "C"	Effective Runoff "C"						
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>DITCH B (EAST/NORTH OF CITRUS WAY)</b>												
B1	1.84	0.00	0.00	1.84	0.45	0.45	0.83	0.83	10.00	25-yr.	7.55	6.25
B2	3.24	0.00	0.00	3.24	0.45	0.45	1.46	2.29	13.33	25-yr.	6.75	15.43
B3	0.65	0.00	0.00	0.65	0.45	0.45	0.29	2.58	14.47	25-yr.	6.52	16.82
B4	3.62	0.00	0.00	3.62	0.45	0.45	1.63	4.21	17.14	25-yr.	6.05	25.44
B5	2.18	0.00	0.00	2.18	0.45	0.45	0.98	5.19	19.40	25-yr.	5.70	29.59
B6	1.81	0.00	0.00	1.81	0.45	0.45	0.81	6.00	19.94	25-yr.	5.63	33.78
B7	1.90	0.00	0.00	1.90	0.45	0.45	0.86	6.86	20.44	25-yr.	5.56	38.13
B8	2.13	0.00	0.00	2.13	0.45	0.45	0.96	7.82	21.86	25-yr.	5.38	42.02
B9	0.33	0.00	0.00	0.33	0.45	0.45	0.15	7.97	22.46	25-yr.	5.30	42.24
B10	6.15	0.00	0.00	6.15	0.45	0.45	2.77	10.73	24.38	25-yr.	5.08	54.55
<b>DITCH C (SOUTH/WEST OF CITRUS WAY)</b>												
C1	0.72	0.00	0.00	0.72	0.45	0.45	0.32	0.32	10.00	25-yr.	7.55	2.45
C2	1.65	0.00	0.00	1.65	0.45	0.45	0.74	1.07	18.07	25-yr.	5.90	6.29
C3	0.62	0.00	0.00	0.62	0.45	0.45	0.28	1.35	20.41	25-yr.	5.56	7.48
<b>TOTAL FLOW TO CITRUS CULVERT (SOUTHEAST)</b>												
								12.08	24.38	25-yr.	5.08	61.38
<b>DITCH D - BERM (NORTH OF CITRUS/WEST OF MANGO? TO BERM AT KINGSWOOD)</b>												
D1	0.33	0.00	0.00	0.33	0.45	0.45	0.15	0.15	5.00	25-yr.	9.28	1.38
D2	1.40	0.00	0.00	1.40	0.45	0.45	0.63	0.78	7.58	25-yr.	8.28	6.45
D3	0.57	0.00	0.00	0.57	0.45	0.45	0.26	1.04	9.20	25-yr.	7.78	8.05
D4	0.36	0.00	0.00	0.36	0.45	0.45	0.16	1.20	10.83	25-yr.	7.33	8.78
D5	1.11	0.00	0.00	1.11	0.45	0.45	0.50	1.70	12.14	25-yr.	7.01	11.90
D6	2.79	0.00	0.00	2.79	0.45	0.45	1.26	2.95	13.30	25-yr.	6.76	19.95
D7	1.23	0.00	0.00	1.23	0.45	0.45	0.55	3.51	14.29	25-yr.	6.56	22.99
D8	4.62	0.00	0.00	4.62	0.45	0.45	2.08	5.58	15.77	25-yr.	6.28	35.07
D9	5.21	0.00	0.00	5.21	0.45	0.45	2.34	7.93	20.60	25-yr.	5.54	43.91
D10	4.79	0.00	0.00	4.79	0.45	0.45	2.16	10.08	24.26	25-yr.	5.10	51.39
<b>DITCH E (EAST OF CITRUS)</b>												
E1	0.89	0.00	0.00	0.89	0.45	0.45	0.40	0.40	5.00	25-yr.	9.28	3.72
E2	0.29	0.00	0.00	0.29	0.45	0.45	0.13	0.53	6.07	25-yr.	8.84	4.69
E3	0.63	0.00	0.00	0.63	0.45	0.45	0.28	0.81	8.38	25-yr.	8.02	6.54
<b>DITCH F (EAST OF CITRUS - EAST OF ORCHARD)</b>												
F1	0.19	0.00	0.00	0.19	0.45	0.45	0.09	0.09	5.00	25-yr.	9.28	0.79
F2	0.12	0.00	0.00	0.12	0.45	0.45	0.05	0.14	5.88	25-yr.	8.91	1.24
F3	0.14	0.00	0.00	0.14	0.45	0.45	0.06	0.20	6.93	25-yr.	8.51	1.72

**Client:** City of Lucas, Texas  
**Project:** Lemontree & Kingswood Drainage Design  
Lemontree Estates

**Date:** 11/18/21  
**By:** JRC

Incremental Drainage Area							Incremental "CA"	Accumulated "CA"	Time of of Concentration (Min.)	Design Storm Frequency (Yrs.)	Intensity (I) (In./Hr.)	Total Flow (Q) (c.f.s.)
Area. No.	Total Area (Ac.)	Offsite Area (Ac.)	Offsite Area "C"	Onsite Area (Ac.)	Onsite Area "C"	Effective Runoff "C"						
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>DITCH BCEF (SE OF CITRUS TO KINGSWOOD BERM)</b>												
DITCH B								10.73	24.38	25-yr.	5.08	54.55
DITCH C								12.08	24.38	25-yr.	5.08	61.38
DITCH E								12.89	24.38	25-yr.	5.08	65.52
DITCH F								13.10	24.38	25-yr.	5.08	66.55
BCEF1	1.14	0.00	0.00	1.14	0.45	0.45	0.51	13.61	24.38	25-yr.	5.08	69.16
<b>DITCH L-K (WEST OF BERM TO SOUTH PROPERTY LINE)</b>												
DITCH D-BERM								10.08	24.26	25-yr.	5.10	51.39
DITCH BCEF								23.69	24.84	25-yr.	5.03	119.26
D11	5.33	0.00	0.00	5.33	0.45	0.45	2.40	26.09	25.83	25-yr.	4.93	128.63
D12	2.01	0.00	0.00	2.01	0.45	0.45	0.90	27.00	27.80	25-yr.	4.74	127.93
<b>DITCH G (EAST OF NORTH ORCHARD CULVERT)</b>												
DITCH A1+A2								16.93	23.32	25-yr.	5.20	88.07
G1	1.10	0.00	0.00	1.10	0.25	0.25	0.28	17.21	23.49	25-yr.	5.18	89.17
G2	0.42	0.00	0.00	0.42	0.45	0.45	0.19	17.40	23.60	25-yr.	5.17	89.93
G3	1.15	0.00	0.00	1.15	0.45	0.45	0.52	17.92	23.83	25-yr.	5.14	92.14



**EXHIBIT A-8**  
**CORRECTED EFFECTIVE HEC-HMS MODEL SCHEMATIC**

**EXHIBIT A-9**  
**GLOBAL SUMMARY TABLES**

HEC-HMS Global Summary Table  
100-Year Corrected Effective Flows

Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
	Sq Mi	cfs		
HS-S	0.038	184.5	14Oct2021, 12:06	9.34
LJHS Pond	0.038	94.8	14Oct2021, 12:21	9.33
RR-OUT	0.0475	184.4	14Oct2021, 12:12	7.61
Reach-1-LJHS	0.038	94.7	14Oct2021, 12:24	9.32
JCT-2	0.0855	262	14Oct2021, 12:12	8.37
Rimrock Pond	0.0855	211.2	14Oct2021, 12:24	8.36
Orchard S West	0.0855	211.2	14Oct2021, 12:27	8.36
LTOS-South	0.0224	71.7	14Oct2021, 12:21	7.82
LTOS-North	0.0024	12.4	14Oct2021, 12:03	7.68
JCT-Orch-S	0.1103	281.6	14Oct2021, 12:24	8.23
Orchard S East	0.1103	280.8	14Oct2021, 12:27	8.23
LTW-1	0.0586	177	14Oct2021, 12:24	7.82
JCT-Orch-N	0.0586	177	14Oct2021, 12:24	7.82
Orchard N East	0.0586	177	14Oct2021, 12:27	7.82
G1-3	0.0042	16.7	14Oct2021, 12:09	7.14
LTOSE	0.0039	15.4	14Oct2021, 12:12	7.73
JCT-LT-South	0.177	474.7	14Oct2021, 12:24	8.06
DS-1	0.177	474.6	14Oct2021, 12:27	8.05
OS-2	0.0294	88.4	14Oct2021, 12:21	7.17
JCT-Pond	0.2064	556.1	14Oct2021, 12:27	7.93
DS-2	0.2064	555	14Oct2021, 12:27	7.93
LTE-1	0.0373	53.9	14Oct2021, 12:27	7.53
LTO-1	0.00468	17.6	14Oct2021, 12:12	7.83
JCT-Citr-E	0.04198	68.5	14Oct2021, 12:18	7.57
To Kingswood	0.04198	68.4	14Oct2021, 12:18	7.56
LT-KW	0.035	108.2	14Oct2021, 12:21	7.43
DA-E	0.0029	13.5	14Oct2021, 12:06	7.74
JCT-Kings-1	0.07988	182.6	14Oct2021, 12:18	7.51
KW-SW-1	0.07988	182.5	14Oct2021, 12:21	7.51
LTS-1	0.01516	53.3	14Oct2021, 12:15	7.49
KW-S1	0.00314	13.6	14Oct2021, 12:06	7.5
JCT-Kings-2	0.09818	240.6	14Oct2021, 12:18	7.51
KW-SW-2	0.09818	239.4	14Oct2021, 12:21	7.51
OS-3	0.0187	56	14Oct2021, 12:21	7.13
JCT-Kings-3	0.32328	835.5	14Oct2021, 12:24	7.75
DS-3	0.32328	832.5	14Oct2021, 12:27	7.75
CS-1	0.08266	290.9	14Oct2021, 12:15	7.93
CS-2-South	0.08281	321.6	14Oct2021, 12:12	7.62
CS2-Pond	0.08281	307.7	14Oct2021, 12:15	7.58
Outside CS	0.11906	473.4	14Oct2021, 12:09	7.61
To CS-1	0.08281	307.7	14Oct2021, 12:24	7.57
JCT-CSOff	0.20187	644.1	14Oct2021, 12:15	7.59
CS1-Pond	0.08266	268.4	14Oct2021, 12:21	7.87
Estates-J1	0.28453	894.8	14Oct2021, 12:18	7.67
EP-R1	0.28453	894.8	14Oct2021, 12:18	7.67
EP	0.0042	18.4	14Oct2021, 12:09	8.62
Estates-J2	0.28873	908.1	14Oct2021, 12:18	7.69
RBT1-1	0.28873	905.1	14Oct2021, 12:27	7.68
KW-2	0.0221	77.9	14Oct2021, 12:15	7.55
JCT-LT-RBT1	0.63411	1793.8	14Oct2021, 12:27	7.71
RBT1-2	0.63411	1793.7	14Oct2021, 12:30	7.71
LLWS	0.0405	124	14Oct2021, 12:21	7.6
LLWN	0.0228	82.9	14Oct2021, 12:12	7.61
JCT-End	0.69741	1951.5	14Oct2021, 12:27	7.7
Out	0.69741	1951.5	14Oct2021, 12:30	7.69
LLEast	0.01709	51.6	14Oct2021, 12:21	7.17
JCT-DSLlimit	0.7145	1995.1	14Oct2021, 12:30	7.68

HEC-HMS Global Summary Table  
25-Year Corrected Effective Flows

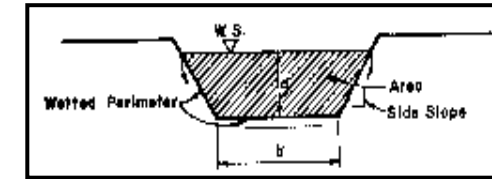
Hydrologic Element	Drainage Area	Peak Discharge	Time of Peak	Volume
HS-S	0.038	145.6	14Oct2021, 12:06	7.35
LJHS Pond	0.038	77.3	14Oct2021, 12:21	7.33
RR-OUT	0.0475	139.4	14Oct2021, 12:12	5.69
Reach-1-LJHS	0.038	77.3	14Oct2021, 12:24	7.33
JCT-2	0.0855	202.2	14Oct2021, 12:12	6.42
Rimrock Pond	0.0855	169.5	14Oct2021, 12:24	6.41
Orchard S West	0.0855	169.5	14Oct2021, 12:27	6.41
LTOS-South	0.0224	54.6	14Oct2021, 12:21	5.89
LTOS-North	0.0024	9.4	14Oct2021, 12:03	5.75
JCT-Orch-S	0.1103	224.2	14Oct2021, 12:24	6.29
Orchard S East	0.1103	223.4	14Oct2021, 12:24	6.28
LTW-1	0.0586	134.8	14Oct2021, 12:24	5.89
JCT-Orch-N	0.0586	134.8	14Oct2021, 12:24	5.89
Orchard N East	0.0586	134.8	14Oct2021, 12:27	5.88
G1-3	0.0042	12.4	14Oct2021, 12:09	5.25
LTOSE	0.0039	11.7	14Oct2021, 12:12	5.8
JCT-LT-South	0.177	372.2	14Oct2021, 12:24	6.12
DS-1	0.177	371.7	14Oct2021, 12:27	6.11
OS-2	0.0294	65.8	14Oct2021, 12:21	5.29
JCT-Pond	0.2064	432.7	14Oct2021, 12:27	6
DS-2	0.2064	431.9	14Oct2021, 12:27	6
LTE-1	0.0373	40.4	14Oct2021, 12:27	5.63
LTO-1	0.00468	13.4	14Oct2021, 12:12	5.9
JCT-Citr-E	0.04198	51.5	14Oct2021, 12:18	5.66
To Kingswood	0.04198	51.4	14Oct2021, 12:18	5.66
LT-KW	0.035	81.3	14Oct2021, 12:21	5.52
DA-E	0.0029	10.2	14Oct2021, 12:06	5.81
JCT-Kings-1	0.07988	137.3	14Oct2021, 12:21	5.6
KW-SW-1	0.07988	137.3	14Oct2021, 12:21	5.6
LTS-1	0.01516	40.2	14Oct2021, 12:15	5.58
KW-S1	0.00314	10.2	14Oct2021, 12:06	5.59
JCT-Kings-2	0.09818	181	14Oct2021, 12:18	5.6
KW-SW-2	0.09818	180.2	14Oct2021, 12:21	5.6
OS-3	0.0187	41.7	14Oct2021, 12:21	5.24
JCT-Kings-3	0.32328	642.3	14Oct2021, 12:24	5.83
DS-3	0.32328	640.7	14Oct2021, 12:27	5.83
CS-1	0.08266	221.9	14Oct2021, 12:15	5.99
CS-2-South	0.08281	243.3	14Oct2021, 12:12	5.7
CS2-Pond	0.08281	229.9	14Oct2021, 12:15	5.67
Outside CS	0.11906	357.3	14Oct2021, 12:09	5.69
To CS-1	0.08281	229.9	14Oct2021, 12:24	5.66
JCT-CSOff	0.20187	482.5	14Oct2021, 12:15	5.68
CS1-Pond	0.08266	199.8	14Oct2021, 12:21	5.94
Estates-J1	0.28453	667	14Oct2021, 12:18	5.75
EP-R1	0.28453	667	14Oct2021, 12:18	5.75
EP	0.0042	14.3	14Oct2021, 12:09	6.65
Estates-J2	0.28873	677.4	14Oct2021, 12:18	5.77
RBT1-1	0.28873	676.1	14Oct2021, 12:27	5.76
KW-2	0.0221	58.8	14Oct2021, 12:15	5.64
JCT-LT-RBT1	0.63411	1359.5	14Oct2021, 12:27	5.79
RBT1-2	0.63411	1358.5	14Oct2021, 12:30	5.79
LLWS	0.0405	93.6	14Oct2021, 12:21	5.68
LLWN	0.0228	62.6	14Oct2021, 12:15	5.69
JCT-End	0.69741	1478.3	14Oct2021, 12:30	5.78
Out	0.69741	1478.3	14Oct2021, 12:33	5.78
LLEast	0.01709	38.4	14Oct2021, 12:21	5.29
JCT-DSLlimit	0.7145	1508.1	14Oct2021, 12:33	5.76

***APPENDIX B***

***HYDRAULIC DESIGN***

## EXHIBIT B-1a

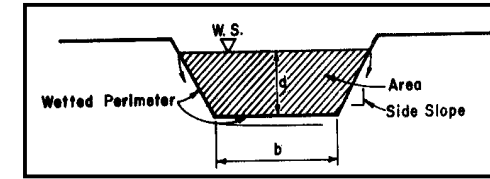
### OPEN CHANNEL CALCULATIONS DITCHES A1 & A2



CHANNEL STATION		Channel Type	Flow "Q" (c.f.s.)	Roughness Coeff. "n"	Slope "S" (ft./ft.)	"S" <sup>1/2</sup>	$\frac{Q \times n}{1.486 \times S^{1/2}}$	Width "b" (feet)	Depth "d" (feet)	Side Slope	Area "A" (sq. ft.)	Wetted Perimeter "WP" (feet)	Hydraulic Radius "R" = $\frac{A}{WP}$ (feet)	R <sup>2/3</sup>	A x R <sup>2/3</sup>	Velocity V = $\frac{Q}{A}$ (f.p.s.)	Velocity Head $\frac{V^2}{2g}$ (ft.)	REMARKS
From 1	To 2																	
		Trapezoid	3.93	0.030	0.0050	0.0707	1.12	1	0.63	4	2.218	6.04	0.367	0.513	1.14	1.77		Ditch A-1
		Trapezoid	3.93	0.030	0.0040	0.0632	1.25	1	0.66	4	2.402	6.28	0.383	0.527	1.27	1.64		
		Trapezoid	7.39	0.030	0.0050	0.0707	2.11	1	0.82	4	3.510	7.56	0.464	0.599	2.10	2.11		
		Trapezoid	7.39	0.030	0.0040	0.0632	2.36	1	0.86	4	3.818	7.88	0.485	0.617	2.36	1.94		
		Trapezoid	15.37	0.030	0.0050	0.0707	4.39	1	1.12	4	6.138	9.96	0.616	0.724	4.44	2.50		
		Trapezoid	15.37	0.030	0.0040	0.0632	4.91	1	1.17	4	6.646	10.36	0.641	0.744	4.94	2.31		
		Trapezoid	29.91	0.030	0.0050	0.0707	8.54	1	1.46	4	9.986	12.68	0.788	0.853	8.52	2.99		
		Trapezoid	29.91	0.030	0.0040	0.0632	9.55	1	1.53	4	10.894	13.24	0.823	0.878	9.56	2.75		
		Trapezoid	30.10	0.030	0.0050	0.0707	8.59	1	1.47	4	10.114	12.76	0.793	0.856	8.66	2.98		
		Trapezoid	30.10	0.030	0.0040	0.0632	9.61	1	1.54	4	11.026	13.32	0.828	0.882	9.72	2.73		
		Trapezoid	51.77	0.030	0.0050	0.0707	14.78	1	1.82	4	15.070	15.56	0.968	0.979	14.75	3.44		
		Trapezoid	51.77	0.030	0.0040	0.0632	16.52	1	1.91	4	16.502	16.28	1.014	1.009	16.65	3.14		
		Trapezoid	65.26	0.030	0.0050	0.0707	18.63	1	2.00	4	18.000	17.00	1.059	1.039	18.70	3.63		
		Trapezoid	65.26	0.030	0.0040	0.0632	20.83	1	2.09	4	19.562	17.72	1.104	1.068	20.90	3.34		
		Trapezoid	68.23	0.030	0.0050	0.0707	19.48	1	2.03	4	18.514	17.24	1.074	1.049	19.41	3.69		
		Trapezoid	68.23	0.030	0.0040	0.0632	21.78	1	2.13	4	20.278	18.04	1.124	1.081	21.92	3.36		
		Trapezoid	77.92	0.030	0.0050	0.0707	22.25	1	2.14	4	20.458	18.12	1.129	1.084	22.18	3.81		
		Trapezoid	77.92	0.030	0.0040	0.0632	24.87	1	2.24	4	22.310	18.92	1.179	1.116	24.90	3.49		
		Trapezoid	78.30	0.030	0.0050	0.0707	22.35	1	2.15	4	20.640	18.20	1.134	1.088	22.45	3.79		
		Trapezoid	78.30	0.030	0.0040	0.0632	24.99	1	2.24	4	22.310	18.92	1.179	1.116	24.90	3.51		
		Trapezoid	77.31	0.030	0.0050	0.0707	22.07	1	2.14	4	20.458	18.12	1.129	1.084	22.18	3.78		
		Trapezoid	77.31	0.030	0.0040	0.0632	24.68	1	2.23	4	22.122	18.84	1.174	1.113	24.62	3.49		
		Trapezoid	77.23	0.030	0.0050	0.0707	22.05	1	2.14	4	20.458	18.12	1.129	1.084	22.18	3.77		
		Trapezoid	77.23	0.030	0.0040	0.0632	24.65	1	2.23	4	22.122	18.84	1.174	1.113	24.62	3.49		
		Trapezoid	76.86	0.030	0.0050	0.0707	21.94	1	2.13	4	20.278	18.04	1.124	1.081	21.92	3.79		
		Trapezoid	76.86	0.030	0.0040	0.0632	24.53	1	2.23	4	22.122	18.84	1.174	1.113	24.62	3.47		
		Trapezoid	76.85	0.030	0.0050	0.0707	21.94	1	2.13	4	20.278	18.04	1.124	1.081	21.92	3.79		
		Trapezoid	76.85	0.030	0.0040	0.0632	24.53	1	2.23	4	22.122	18.84	1.174	1.113	24.62	3.47		
		Trapezoid	34.36	0.030	0.0050	0.0707	9.81	1	1.55	4	11.160	13.40	0.833	0.885	9.88	3.08		Ditch A-2
		Trapezoid	40.29	0.030	0.0050	0.0707	11.50	1	1.65	4	12.540	14.20	0.883	0.920	11.54	3.21		
		Trapezoid	114.54	0.030	0.0050	0.0707	32.70	4	2.18	4	27.730	21.44	1.293	1.187	32.92	4.13		Ditch G
		Trapezoid	115.88	0.030	0.0050	0.0707	33.09	4	2.19	4	27.944	21.52	1.299	1.190	33.26	4.15		

## EXHIBIT B-1b

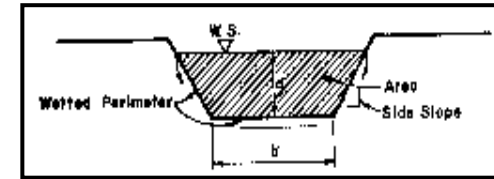
### OPEN CHANNEL CALCULATIONS DITCHES B1, C1, D, BCEF & L-K



CHANNEL STATION		Channel Type	Flow "Q" (c.f.s.)	Roughness Coeff. "n"	Slope "S" (ft./ft.)	"S" <sup>1/2</sup>	$\frac{Q \times n}{1.486 \times S^{1/2}}$	Width "b" (feet)	Depth "d" (feet)	Side Slope	Area "A" (sq. ft.)	Wetted Perimeter "WP" (feet)	Hydraulic Radius "R" = $\frac{A}{WP}$ (feet)	R <sup>2/3</sup>	A x R <sup>2/3</sup>	Velocity V = $\frac{Q}{A}$ (f.p.s.)	Velocity Head $\frac{v^2}{2g}$ (ft.)	REMARKS
From	To																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
B1		Trapezoid	7.61	0.030	0.0050	0.0707	2.17	1	0.83	4	3.586	7.64	0.469	0.604	2.16	2.12		
B2		Trapezoid	18.97	0.030	0.0050	0.0707	5.41	1	1.22	4	7.174	10.76	0.667	0.763	5.47	2.64		
B3		Trapezoid	20.70	0.030	0.0050	0.0707	5.91	1	1.26	4	7.610	11.08	0.687	0.778	5.92	2.72		
B4		Trapezoid	31.46	0.030	0.0050	0.0707	8.98	1	1.49	4	10.370	12.92	0.803	0.864	8.96	3.03		
B5		Trapezoid	36.69	0.030	0.0050	0.0707	10.47	1	1.59	4	11.702	13.72	0.853	0.899	10.52	3.14		
B6		Trapezoid	41.91	0.030	0.0050	0.0707	11.96	1	1.68	4	12.970	14.44	0.898	0.931	12.07	3.23		
B7		Trapezoid	47.33	0.030	0.0050	0.0707	13.51	1	1.76	4	14.150	15.08	0.938	0.958	13.56	3.34		
B8		Trapezoid	52.24	0.030	0.0050	0.0707	14.91	1	1.83	4	15.226	15.64	0.974	0.982	14.96	3.43		
B9		Trapezoid	52.56	0.030	0.0050	0.0707	15.01	1	1.84	4	15.382	15.72	0.979	0.986	15.16	3.42		
B10		Trapezoid	68.00	0.030	0.0050	0.0707	19.41	1	2.03	4	18.514	17.24	1.074	1.049	19.41	3.67		
C1		Trapezoid	2.98	0.030	0.0050	0.0707	0.85	1	0.55	4	1.760	5.40	0.326	0.473	0.83	1.69		
C2		Trapezoid	7.81	0.030	0.0050	0.0707	2.23	1	0.84	4	3.662	7.72	0.474	0.608	2.23	2.13		
C3		Trapezoid	9.32	0.030	0.0050	0.0707	2.66	1	0.91	4	4.222	8.28	0.510	0.638	2.69	2.21		
D1		Trapezoid	1.67	0.030	0.0050	0.0707	0.48	1	0.43	4	1.170	4.44	0.263	0.411	0.48	1.43		
D2		Trapezoid	7.51	0.030	0.0050	0.0707	2.14	1	0.83	4	3.586	7.64	0.469	0.604	2.16	2.09		
D3		Trapezoid	9.40	0.030	0.0050	0.0707	2.69	1	0.91	4	4.222	8.28	0.510	0.638	2.69	2.23		
D4		Trapezoid	10.31	0.030	0.0050	0.0707	2.94	1	0.94	4	4.474	8.52	0.525	0.651	2.91	2.30		
D5		Trapezoid	14.03	0.030	0.0050	0.0707	4.00	1	1.07	4	5.650	9.56	0.591	0.704	3.98	2.48		
D6		Trapezoid	23.52	0.030	0.0050	0.0707	6.71	1	1.33	4	8.406	11.64	0.722	0.805	6.76	2.80		
D7		Trapezoid	27.18	0.030	0.0050	0.0707	7.76	1	1.41	4	9.362	12.28	0.762	0.834	7.81	2.90		
D8		Berm	41.26	0.035	0.0050	0.0707	13.74	0	1.53	7	16.386	21.42	0.765	0.836	13.71	2.52		Ave. SS 4:1 & 10:1
D9		Berm	52.61	0.035	0.0050	0.0707	17.53	0	1.68	7	19.757	23.52	0.840	0.890	17.59	2.66		Ave. SS 4:1 & 10:1
D10		Berm	62.25	0.035	0.0050	0.0707	20.74	0	1.79	7	22.429	25.06	0.895	0.929	20.83	2.78		Ave. SS 4:1 & 10:1
BCEF		Trapezoid	86.22	0.030	0.0050	0.0707	24.62	2	2.12	4	22.218	18.96	1.172	1.112	24.70	3.88		
L-K1		Trapezoid	144.56	0.030	0.0050	0.0707	41.27	4	2.41	4	32.872	23.28	1.412	1.259	41.38	4.40		
L-K2		Trapezoid	156.09	0.030	0.0050	0.0707	44.56	4	2.49	4	34.760	23.92	1.453	1.283	44.60	4.49		
KWE		Trapezoid	54.79	0.030	0.0050	0.0707	15.64	2	1.76	4	15.910	16.08	0.989	0.993	15.80	3.44		

**EXHIBIT B-1c**

**OPEN CHANNEL CALCULATIONS  
DITCHES OSW1, ONW1 & OSE1**



CHANNEL STATION		Channel Type	Flow "Q" (c.f.s.)	Roughness Coeff. "n"	Slope "S" (ft./ft.)	"S" <sup>1/2</sup>	$\frac{Q \times n}{1.486 \times S^{1/2}}$	Width "b" (feet)	Depth "d" (feet)	Side Slope	Area "A" (sq. ft.)	Wetted Perimeter "WP" (feet)	Hydraulic Radius "R" = $\frac{A}{WP}$ (feet)	R <sup>2/3</sup>	A x R <sup>2/3</sup>	Velocity $V = \frac{Q}{A}$ (f.p.s.)	Velocity Head $\frac{V^2}{2g}$ (ft.)	REMARKS
From	To																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
OSW1		Trapezoid	9.68	0.030	0.0050	0.0707	2.76	1	0.92	4	4.306	8.36	0.515	0.642	2.77	2.25		
		Trapezoid	24.20	0.030	0.0050	0.0707	6.91	1	1.35	4	8.640	11.80	0.732	0.812	7.02	2.80		
		Trapezoid	38.59	0.030	0.0050	0.0707	11.02	1	1.62	4	12.118	13.96	0.868	0.910	11.03	3.18		
		Trapezoid	43.58	0.030	0.0050	0.0707	12.44	1	1.70	4	13.260	14.60	0.908	0.938	12.44	3.29		
		Trapezoid	46.21	0.030	0.0050	0.0707	13.19	1	1.74	4	13.850	14.92	0.928	0.952	13.18	3.34		
		Trapezoid	48.78	0.030	0.0050	0.0707	13.93	1	1.78	4	14.454	15.24	0.948	0.965	13.95	3.37		
OSE1		Trapezoid	1.77	0.030	0.0050	0.0707	0.51	1	0.44	4	1.214	4.52	0.269	0.416	0.51	1.46		
		Trapezoid	4.50	0.030	0.0050	0.0707	1.28	1	0.66	4	2.402	6.28	0.383	0.527	1.27	1.87		
		Trapezoid	7.42	0.030	0.0050	0.0707	2.12	1	0.82	4	3.510	7.56	0.464	0.599	2.10	2.11		
		Trapezoid	8.45	0.030	0.0050	0.0707	2.41	1	0.87	4	3.898	7.96	0.490	0.621	2.42	2.17		
		Trapezoid	8.85	0.030	0.0050	0.0707	2.53	1	0.89	4	4.058	8.12	0.500	0.630	2.56	2.18		
ONW1		Trapezoid	0.91	0.030	0.0050	0.0707	0.26	1	0.33	4	0.766	3.64	0.210	0.353	0.27	1.19		
		Trapezoid	6.00	0.030	0.0050	0.0707	1.71	1	0.75	4	3.000	7.00	0.429	0.568	1.70	2.00		
Orchard West		Trapezoid	211.20	0.030	0.0088	0.0938	45.45	6	1.95	8	42.120	37.20	1.132	1.086	45.76	5.01		South Crossing
Orchard East		Trapezoid	280.80	0.030	0.0080	0.0894	63.38	6	2.24	8	53.581	41.84	1.281	1.179	63.19	5.24		South Crossing

**EXHIBIT B-2**

**Lemontree Culvert Design Table**

All designs based on culverts and ditches constructed with 0.50% slope, 1-ft. bottom width and 4:1 side slopes, maintained ditch with Manning's "n" value = 0.030

Ditch Name	Driveway or Street Name	Culvert Size	No. of Culverts	Pipe or Box	Upstream F.L.	100-Yr Flow (cfs)	100-Yr HW Depth (ft.)	100-Yr Velocity (fps)	25-Yr Flow (cfs)	25-Yr HW Depth (ft.)	25-Yr Velocity (fps)
		Span x Rise									
A1	Citrus A1-1	15"	1	Pipe		3.93	1.31	4.73	3.23	1.17	4.38
A1	Citrus A1-2	18"	1	Pipe		7.39	1.76	5.58	6.01	1.55	5.11
A1	Citrus A1-3	24"	1	Pipe		15.37	2.44	6.61	12.35	1.55	5.99
A1	Citrus A1-4	3' x 2'	1	Box		29.91	2.00	7.07	23.66	1.61	5.89
A1	Citrus A1-5	3' x 2'	1	Box		30.10	2.01	7.08	23.73	1.62	5.90
A1	Citrus A1-6	4' x 2'	1	Box		51.77	2.80	7.98	40.60	2.20	6.10
A1	Citrus A1-7a	3' x 2'	2	Box		68.23	2.77	5.69	53.39	2.33	4.79
A1	Citrus A1-8	4' x 2'	2	Box		77.92	2.64	4.87	62.16	2.24	3.94
A1	Citrus A1-9	4' x 2'	2	Box		78.30	2.65	4.89	62.21	2.24	3.94
A1	Citrus A1-10	4' x 2'	2	Box		77.31	2.62	4.83	62.01	2.24	3.93
A1	Citrus A1-11	4' x 2'	2	Box		77.23	2.62	4.83	60.31	2.20	3.87
A1	Citrus A1-12	4' x 2'	2	Box		76.86	2.61	4.80	59.92	2.20	3.85
A1	Citrus A1-13	4' x 2'	2	Box		76.85	2.61	4.80	59.87	2.20	3.51
North	Orchard Road	5' x 2'	2	Box		113.05	2.84	5.65	88.07	2.60	4.40
B	Citrus B1	18"	1	Pipe		7.61	1.79	5.65	6.25	1.58	5.19
B	Citrus B2	24"	1	Pipe		18.97	2.74	7.18	15.43	2.38	6.49
B	Citrus B3	24"	1	Pipe		20.70	2.93	7.55	16.82	2.51	6.76
B	Citrus B4	24"	2	Pipe		31.46	2.40	6.21	25.44	1.99	6.04
B	Citrus B5	24"	2	Pipe		36.69	2.69	6.81	29.59	2.31	5.99
B	Citrus B6	4' x 2'	1	Box		41.91	2.65	6.21	33.78	2.23	5.46
B	Citrus B7	4' x 2'	1	Box		47.33	2.96	6.68	38.13	2.45	5.87
B	Citrus B8	3' x 2'	2	Box		52.24	2.31	4.73	42.02	2.02	4.15
B	Citrus B9	3' x 2'	2	Box		52.56	2.32	4.74	42.24	2.03	4.16
B	Citrus B10	4' x 2'	2	Box		68.00	2.38	4.25	54.55	2.08	3.64
C	Citrus C1	15"	1	Pipe		2.98	1.11	4.26	2.48	0.92	4.03
C	Citrus C2	18"	1	Pipe		7.81	1.82	5.72	6.29	1.59	5.21
C	Citrus C3	18"	1	Pipe		9.32	2.10	6.25	7.48	1.77	5.61
B-C	Culvert BC	4' x 2'	2	Box		76.53	2.47	4.78	61.38	2.15	4.14
D	Citrus D1	12"	1	Pipe		1.67	0.88	3.78	1.38	0.79	3.54
D	Citrus D2	18"	1	Pipe		7.51	1.77	5.62	6.45	1.61	5.26
D	Citrus D3	18"	1	Pipe		9.40	2.12	6.28	8.05	1.86	5.80
D	Lemon D4	18"	1	Pipe		10.31	2.35	6.62	8.78	1.98	6.06
D	Lemon D5	24"	1	Pipe		14.03	2.25	6.22	11.90	1.90	5.95
D	Lemon D6	21"	2	Pipe		23.52	2.16	5.97	19.95	1.95	5.43
D	Lemon D7	24"	2	Pipe		27.18	2.20	5.71	22.99	1.86	5.21

# EXHIBIT B-2

## Lemontree Culvert Design Table

All designs based on culverts and ditches constructed with 0.50% slope, 1-ft. bottom width and 4:1 side slopes, maintained ditch with Manning's "n" value = 0.030

Ditch Name	Driveway or Street Name	Culvert Size	No. of Culverts	Pipe or Box	Upstream F.L.	100-Yr Flow (cfs)	100-Yr HW Depth (ft.)	100-Yr Velocity (fps)	25-Yr Flow (cfs)	25-Yr HW Depth (ft.)	25-Yr Velocity (fps)
		Span x Rise									
E	Citrus E1	15"	1	Pipe		4.50	1.42	5.00	3.72	1.27	4.62
E	Citrus E2	18"	1	Pipe		5.69	1.50	5.01	4.69	1.25	4.73
E	Citrus E3	18"	1	Pipe		7.95	1.84	5.77	6.54	1.63	5.29
F	Citrus F1	12"	1	Pipe		0.96	0.58	3.18	0.79	0.52	3.01
F	Citrus F2	12"	1	Pipe		1.51	0.83	3.65	1.24	0.74	3.42
F	Citrus F3	12"	1	Pipe		2.09	1.00	4.11	1.72	0.89	3.82
OSW	Orchard W1	18"	1	Pipe		9.68	2.19	6.38	7.95	1.84	5.77
OSW	Orchard W2	18"	2	Pipe		24.20	2.85	7.21	19.67	2.23	6.29
OSW	Orchard W3	24"	2	Pipe		38.59	2.83	7.03	31.29	2.40	6.19
OSW	Orchard W4	4' x 2'	1	Box		43.58	2.74	6.36	35.23	2.30	5.60
OSW	Orchard W5	4' x 2'	1	Box		46.21	2.90	6.59	37.28	2.40	5.79
OSW	Orchard W6	4' x 2'	1	Box		48.78	3.05	7.85	39.29	2.51	5.98
South	Orchard Road	5' x 3'	3	Box		280.80	3.88	10.05	223.40	3.24	9.45
OSE	Orchard E1	12"	1	Pipe		1.77	0.91	3.86	1.46	0.81	3.61
OSE	Orchard E2	15"	1	Pipe		4.50	1.42	5.00	3.66	1.25	4.60
OSE	Orchard E3	18"	1	Pipe		7.42	1.76	5.59	6.01	1.55	5.11
OSE	Orchard E4	18"	1	Pipe		8.45	1.92	5.94	6.81	1.67	5.38
OSE	Orchard E5	18"	1	Pipe		8.85	2.00	6.08	7.10	1.71	5.48

***APPENDIX C***

***LYNN LANE FLOOD STUDY***



**CITY OF LUCAS, TEXAS**

**LEMONTREE & KINGSWOOD DRAINAGE DESIGN  
EXHIBIT C-1 HEC-RAS WORK MAP**

**BIRKHOFF, HENDRICKS & CARTER, L.L.P.**  
 PROFESSIONAL ENGINEERS  
 TBPELS PE Firm 526; Survey Firm 10031800  
 11910 Greenville Ave., Suite 600 Dallas, Texas 75243 (214) 361-7900

January  
2022

HEC-RAS HEC-RAS 5.0.3 September 2016  
 U.S. Army Corps of Engineers  
 Hydrologic Engineering Center  
 609 Second Street  
 Davis, California

```

X   X XXXXXX   XXXX   XXXX   XX   XXXX
X   X X       X   X   X   X   X   X   X
X   X X       X       X   X   X   X   X
XXXXXXXX XXXX   X       XXX XXXX   XXXXXX   XXXX
X   X X       X       X   X   X   X       X
X   X X       X   X   X   X   X   X   X
X   X XXXXXX   XXXX   X   X   X   X   XXXXX
    
```

PROJECT DATA

Project Title: Reid Br Trib 1-Ex Lynn  
 Project File : ExLynn1.prj  
 Run Date and Time: 12/2/2021 12:40:00 PM

Project in English units

PLAN DATA

Plan Title: Plan 02  
 Plan File : h:\Projects\Lucas\2021136 Lemontree-Kingswood Drainage\Engineering\HEC-RAS\ExLynn1.p02

Geometry Title: ExGeo-Lynn  
 Geometry File : h:\Projects\Lucas\2021136 Lemontree-Kingswood Drainage\Engineering\HEC-RAS\ExLynn1.g01

Flow Title : EX-Multi  
 Flow File : h:\Projects\Lucas\2021136 Lemontree-Kingswood Drainage\Engineering\HEC-RAS\ExLynn1.f02

Plan Description:  
 Existing Conditions

Plan Summary Information:

Number of:	Cross Sections =	7	Multiple Openings =	0
	Culverts =	1	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

Computation Options

Critical depth computed only where necessary  
 Conveyance Calculation Method: At breaks in n values only  
 Friction Slope Method: Average Conveyance

Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: EX-Multi  
 Flow File : h:\Projects\Lucas\2021136 Lemontree-Kingswood Drainage\Engineering\HEC-RAS\ExLynn1.f02

Flow Data (cfs)

River	Reach	RS	100-Yr	25-Yr	10-Yr	5-Yr	2-Yr
Reid Branch Trib	Reid Branch Trib	843.95	1951.5	1478.3	1168.6	953.6	622
Reid Branch Trib	Reid Branch Trib	485.57	1951.5	1478.3	1168.6	953.6	622
Reid Branch Trib	Reid Branch Trib	331.24	1975	1493	1180	963	629
Reid Branch Trib	Reid Branch Trib	31.74	1995.1	1508.1	1192	972.6	634.2

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Reid Branch Trib	Reid Branch Trib	100-Yr		Normal S = 0.01
Reid Branch Trib	Reid Branch Trib	25-Yr		Normal S = 0.01

GEOMETRY DATA

Geometry Title: ExGeo-Lynn  
 Geometry File : h:\Projects\Lucas\2021136 Lemontree-Kingswood Drainage\Engineering\HEC-RAS\ExLynn1.g01

CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 843.95

INPUT

Description: Upstream Limit of Study

Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	603	99	600.72	121.78	600	134.34	599.32	142.3	598.85
152.45	598.55	172.79	599.45	176.26	599.42	197.23	599.74	202.77	599.26
206.42	598.91	231.36	599.84	241.73	597.33	243.88	597.18	252.04	597.05
258.43	596.56	259.9	595.85	262.02	595.49	263.11	595.66	263.66	595.74
265.11	595.96	270.07	596.94	276.54	598.29	286.57	599.67	287.67	599.62
297.49	601.03	303.84	601.52	304.99	601.55	323.66	601.9	325.42	601.99
343.85	602.13	346.49	602.18	363.24	602.32	377.81	602.16	390.86	602.98
397.79	603.17	403.39	603.17	410.77	603.38	411.36	603.42	411.63	603.41

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	231.36	.045	286.57	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

231.36	286.57	50	187.47	230	.1	.3
--------	--------	----	--------	-----	----	----

CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 656.48

INPUT

Description:

Station Elevation Data		num= 21	
Sta	Elev	Sta	Elev
0	604	82.36	601.33
137.73	598.44	146.65	597.74
198.91	595.09	200.6	594.56
207.95	594.92	214.5	596.67
267.36	601.5		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.045	162.65	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	162.65	214.5		150	89.97		.1	.3

CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 566.51

INPUT

Description: Just US of Lynn Lane

Station Elevation Data		num= 36	
Sta	Elev	Sta	Elev
0	603.35	4.47	603.26
52.41	602.85	58.12	602.73
78.82	601.95	79.33	601.85
110.37	595.31	113.31	595.07
149.87	593.87	151.82	593.93
173.42	597.38	187.76	598.38
232.44	600.43	233.08	600.39
374	603		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.045	103.55	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	103.55	202.27		47.85	47.85		.3	.5

Ineffective Flow		num= 2	
Sta L	Sta R	Elev	Permanent
0	109	600.5	F
158.22	374	600.5	F

CULVERT

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 533.93

INPUT

Description: Lynn Lane Crossing Existing

Distance from Upstream XS = 8

Deck/Roadway Width = 30.5

Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num=	13													
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	603.58	0	59.43	603.14	0	109	601.75	0						
109.1	604.25	0	126.36	603.48	0	156.72	602.91	0						
157	600.5	0	199.51	601.17	0	213.84	601.44	0						
248.06	602	0	274	602.5	0	324	603.5	0						
374	604	0												

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	36											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	603.35	4.47	603.26	14.9	603.38	15.9	603.38	28.94	603.43						
52.41	602.85	58.12	602.73	75.17	602.07	78.38	602	78.59	601.98						
78.82	601.95	79.33	601.85	92.01	600.48	103.55	600.29	105.83	596.39						
110.37	595.31	113.31	595.07	116.05	595.07	123.38	594.73	131.25	593.79						
149.87	593.87	151.82	593.93	158.22	596.48	172.35	597.31	172.74	597.31						
173.42	597.38	187.76	598.38	198.64	599.17	202.27	599.33	216.75	600.22						
232.44	600.43	233.08	600.39	247.73	600.47	274	601	324	602						
374	603														

Manning's n Values

num=	3						
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	103.55	.04	202.27	.045		

Bank Sta: Left Right Coeff Contr. Expan.

103.55	202.27	.3	.5
--------	--------	----	----

Ineffective Flow

num=	2				
Sta L	Sta R	Elev	Permanent		
0	109	600.5	F		
158.22	374	600.5	F		

Downstream Deck/Roadway Coordinates

num=	12													
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	603.73	0	69.47	603.14	0	124.49	601.6	0						
124.77	604.18	0	136.85	603.48	0	166.69	602.91	0						
166.97	600.5	0	209.48	601.17	0	223.81	601.44	0						
257.79	602.08	0	280	602.5	0	330	603	0						

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	31											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	602.64	5.44	602.34	7.86	602.31	31.36	601.87	31.46	601.87						
34.06	601.83	57.36	601.47	57.47	601.47	84.25	601.08	85.04	600.98						
85.47	600.93	108.66	599.48	109.59	599.31	121.55	594.58	125.68	593.94						
134.39	593.22	142.41	593.23	142.43	593.23	156.03	593.26	161.44	593.77						
174.28	597.4	176.72	597.7	194.32	598.67	195.45	598.8	221.27	599.47						
223.41	599.69	223.91	599.7	251.78	599.89	257.79	600.08	280	601						
330	602														

Manning's n Values

num=	3						
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

0 .055 109.59 .04 194.32 .055

Bank Sta: Left Right Coeff Contr. Expan.  
 109.59 194.32 .3 .5

Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 0 119.5 600.5 F  
 165 330 600.5 F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins = 600.41  
 Energy head used in spillway design =  
 Spillway height used in design =  
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span  
 8-48" RCP Circular 4

FHWA Chart # 1 - Concrete Pipe Culvert  
 FHWA Scale # 1 - Square edge entrance with headwall

Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
9	30.24	.012	.012	0	.3	1

Number of Barrels = 8

Upstream Elevation = 593.57

Centerline Stations

Sta.	Sta.	Sta.	Sta.	Sta.	Sta.	Sta.	Sta.
111.7	117.24	123.12	128.76	134.3	139.92	145.75	151.21

Downstream Elevation = 593.23

Centerline Stations

Sta.	Sta.	Sta.	Sta.	Sta.	Sta.	Sta.	Sta.
121.74	127.41	132.97	139.05	144.94	150.61	156.32	162.43

CULVERT OUTPUT Profile #100-Yr Culv Group: 8-48" RCP

Q Culv Group (cfs)	1199.11	Culv Full Len (ft)	30.24
# Barrels	8	Culv Vel US (ft/s)	11.93
Q Barrel (cfs)	149.89	Culv Vel DS (ft/s)	11.93
E.G. US. (ft)	603.11	Culv Inv El Up (ft)	593.57
W.S. US. (ft)	603.03	Culv Inv El Dn (ft)	593.23
E.G. DS (ft)	600.66	Culv Frctn Ls (ft)	0.28
W.S. DS (ft)	599.95	Culv Exit Loss (ft)	1.50
Delta EG (ft)	2.45	Culv Entr Loss (ft)	0.66
Delta WS (ft)	3.07	Q Weir (cfs)	752.39
E.G. IC (ft)	602.96	Weir Sta Lft (ft)	60.64
E.G. OC (ft)	603.11	Weir Sta Rgt (ft)	304.30
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	597.57	Weir Max Depth (ft)	2.61
Culv WS Outlet (ft)	597.23	Weir Avg Depth (ft)	1.14
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	235.41
Culv Crt Depth (ft)	3.59	Min El Weir Flow (ft)	600.51

CULVERT OUTPUT Profile #25-Yr Culv Group: 8-48" RCP

Q Culv Group (cfs)	1169.33	Culv Full Len (ft)	30.24
--------------------	---------	--------------------	-------

# Barrels	8	Culv Vel US (ft/s)	11.63
Q Barrel (cfs)	146.17	Culv Vel DS (ft/s)	11.63
E.G. US. (ft)	602.35	Culv Inv El Up (ft)	593.57
W.S. US. (ft)	602.28	Culv Inv El Dn (ft)	593.23
E.G. DS (ft)	599.85	Culv Frctn Ls (ft)	0.27
W.S. DS (ft)	599.35	Culv Exit Loss (ft)	1.61
Delta EG (ft)	2.51	Culv Entr Loss (ft)	0.63
Delta WS (ft)	2.93	Q Weir (cfs)	308.97
E.G. IC (ft)	602.21	Weir Sta Lft (ft)	87.15
E.G. OC (ft)	602.35	Weir Sta Rgt (ft)	266.87
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	597.57	Weir Max Depth (ft)	1.86
Culv WS Outlet (ft)	597.23	Weir Avg Depth (ft)	0.85
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	112.40
Culv Crt Depth (ft)	3.56	Min El Weir Flow (ft)	600.51

## CULVERT OUTPUT Profile #10-Yr Culv Group: 8-48" RCP

Q Culv Group (cfs)	1103.01	Culv Full Len (ft)	30.24
# Barrels	8	Culv Vel US (ft/s)	10.97
Q Barrel (cfs)	137.88	Culv Vel DS (ft/s)	10.97
E.G. US. (ft)	601.51	Culv Inv El Up (ft)	593.57
W.S. US. (ft)	601.45	Culv Inv El Dn (ft)	593.23
E.G. DS (ft)	599.22	Culv Frctn Ls (ft)	0.24
W.S. DS (ft)	598.85	Culv Exit Loss (ft)	1.50
Delta EG (ft)	2.30	Culv Entr Loss (ft)	0.56
Delta WS (ft)	2.60	Q Weir (cfs)	65.59
E.G. IC (ft)	601.29	Weir Sta Lft (ft)	156.88
E.G. OC (ft)	601.51	Weir Sta Rgt (ft)	218.36
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	597.57	Weir Max Depth (ft)	1.01
Culv WS Outlet (ft)	597.23	Weir Avg Depth (ft)	0.52
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	32.08
Culv Crt Depth (ft)	3.49	Min El Weir Flow (ft)	600.51

## CULVERT OUTPUT Profile #5-Yr Culv Group: 8-48" RCP

Q Culv Group (cfs)	953.60	Culv Full Len (ft)	30.24
# Barrels	8	Culv Vel US (ft/s)	9.49
Q Barrel (cfs)	119.20	Culv Vel DS (ft/s)	9.49
E.G. US. (ft)	600.41	Culv Inv El Up (ft)	593.57
W.S. US. (ft)	600.23	Culv Inv El Dn (ft)	593.23
E.G. DS (ft)	598.71	Culv Frctn Ls (ft)	0.18
W.S. DS (ft)	598.41	Culv Exit Loss (ft)	1.10
Delta EG (ft)	1.70	Culv Entr Loss (ft)	0.42
Delta WS (ft)	1.82	Q Weir (cfs)	
E.G. IC (ft)	599.81	Weir Sta Lft (ft)	
E.G. OC (ft)	600.41	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	597.57	Weir Max Depth (ft)	
Culv WS Outlet (ft)	597.23	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.29	Min El Weir Flow (ft)	600.51

## CULVERT OUTPUT Profile #2-Yr Culv Group: 8-48" RCP

Q Culv Group (cfs)	622.00	Culv Full Len (ft)	30.24
# Barrels	8	Culv Vel US (ft/s)	6.19
Q Barrel (cfs)	77.75	Culv Vel DS (ft/s)	6.19
E.G. US. (ft)	598.45	Culv Inv El Up (ft)	593.57
W.S. US. (ft)	598.28	Culv Inv El Dn (ft)	593.23
E.G. DS (ft)	597.79	Culv Frctn Ls (ft)	0.08
W.S. DS (ft)	597.61	Culv Exit Loss (ft)	0.41
Delta EG (ft)	0.67	Culv Entr Loss (ft)	0.18
Delta WS (ft)	0.68	Q Weir (cfs)	
E.G. IC (ft)	597.78	Weir Sta Lft (ft)	
E.G. OC (ft)	598.45	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	597.57	Weir Max Depth (ft)	
Culv WS Outlet (ft)	597.23	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.67	Min El Weir Flow (ft)	600.51

CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 518.66

INPUT  
 Description: Just DS of Lynn Lane

Station Elevation Data	num= 31										
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	602.64	5.44	602.34	7.86	602.31	31.36	601.87	31.46	601.87		
34.06	601.83	57.36	601.47	57.47	601.47	84.25	601.08	85.04	600.98		
85.47	600.93	108.66	599.48	109.59	599.31	121.55	594.58	125.68	593.94		
134.39	593.22	142.41	593.23	142.43	593.23	156.03	593.26	161.44	593.77		
174.28	597.4	176.72	597.7	194.32	598.67	195.45	598.8	221.27	599.47		
223.41	599.69	223.91	599.7	251.78	599.89	257.79	600.08	280	601		
330	602										

Manning's n Values	num= 3					
Sta	n Val	Sta	n Val	Sta	n Val	
0	.055	109.59	.04	194.32	.055	

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
109.59	194.32	33.09	33.09	33.09	.3	.5

Ineffective Flow	num= 2			
Sta L	Sta R	Elev	Permanent	
0	119.5	600.5	F	
165	330	600.5	F	

CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 485.57

INPUT  
 Description:

Station Elevation Data	num= 16										
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	600.78	2.92	600.74	34.54	597	52.76	594.82	58.27	594.46		
65.81	593.04	73.58	594.01	77.34	594.21	90.64	595.73	103.1	596.03		

137.06 599.61 145.16 599.65 166.24 599.8 167.19 599.8 175.28 600.07  
 197.5 601

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .05 34.54 .05 103.1 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 34.54 103.1 154.33 154.33 154.33 .1 .3

CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 331.24

INPUT

Description:

Station Elevation Data num= 11  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 0 600.75 1.11 600.69 21.43 599.08 22.16 598.88 28.12 597.79  
 61.38 591.43 64.13 591.78 119.4 598.49 138.98 598.72 143.46 598.92  
 206.82 602

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .06 21.43 .06 119.4 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 21.43 119.4 250 299.5 350 .1 .3

CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 31.74

INPUT

Description:

Station Elevation Data num= 17  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 0 600 49.28 597.56 50.49 597.46 51.43 597.36 54.85 596.99  
 113.19 594.39 113.96 594.13 130.65 593.21 142.56 587.99 143.55 588.38  
 158.06 593.61 159.02 593.84 164.97 593.94 169.11 595.89 194.43 597.9  
 196.37 598.28 231.01 599.83

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .06 113.96 .065 158.06 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 113.96 158.06 0 0 0 .1 .3

SUMMARY OF MANNING'S N VALUES

River:Reid Branch Trib

Reach	River Sta.	n1	n2	n3
Reid Branch Trib	843.95	.045	.045	.04
Reid Branch Trib	656.48	.045	.04	.04
Reid Branch Trib	566.51	.045	.04	.045
Reid Branch Trib	533.93	Culvert		
Reid Branch Trib	518.66	.055	.04	.055
Reid Branch Trib	485.57	.05	.05	.05
Reid Branch Trib	331.24	.06	.06	.05
Reid Branch Trib	31.74	.06	.065	.06

SUMMARY OF REACH LENGTHS

River: Reid Branch Trib

Reach	River Sta.	Left	Channel	Right
Reid Branch Trib	843.95	50	187.47	230
Reid Branch Trib	656.48	150	89.97	50
Reid Branch Trib	566.51	47.85	47.85	47.85
Reid Branch Trib	533.93	Culvert		
Reid Branch Trib	518.66	33.09	33.09	33.09
Reid Branch Trib	485.57	154.33	154.33	154.33
Reid Branch Trib	331.24	250	299.5	350
Reid Branch Trib	31.74	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Reid Branch Trib

Reach	River Sta.	Contr.	Expan.
Reid Branch Trib	843.95	.1	.3
Reid Branch Trib	656.48	.1	.3
Reid Branch Trib	566.51	.3	.5
Reid Branch Trib	533.93	Culvert	
Reid Branch Trib	518.66	.3	.5
Reid Branch Trib	485.57	.1	.3
Reid Branch Trib	331.24	.1	.3
Reid Branch Trib	31.74	.1	.3

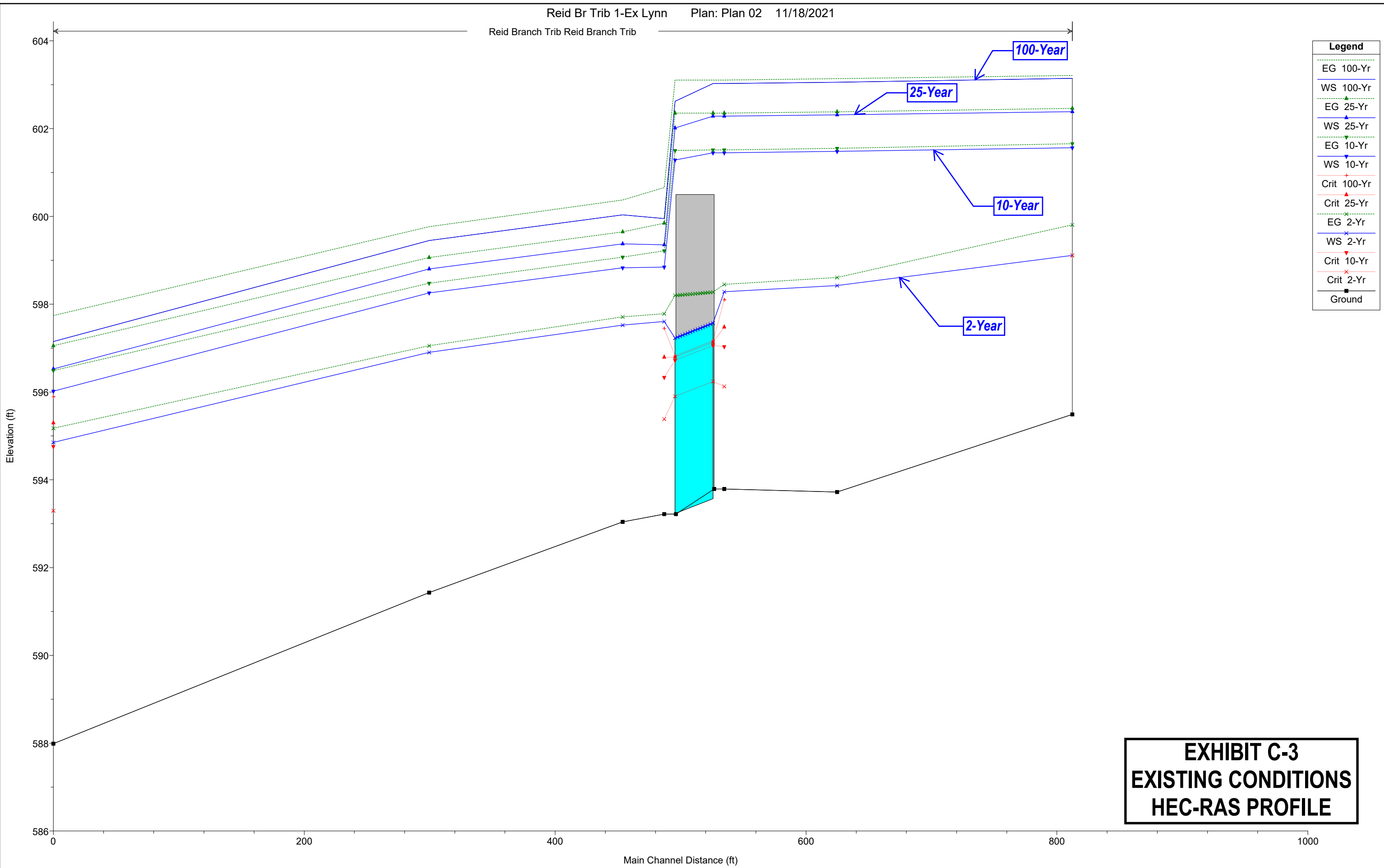
Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ch1
Reid Branch Trib	843.95	100-Yr	1951.50	595.49	603.14		603.21	0.000657	2.64	1054.74	396.86	0.20
Reid Branch Trib	843.95	25-Yr	1478.30	595.49	602.39		602.46	0.000835	2.70	768.75	354.75	0.22
Reid Branch Trib	843.95	10-Yr	1168.60	595.49	601.56		601.66	0.001275	2.95	529.82	243.28	0.26
Reid Branch Trib	843.95	5-Yr	953.60	595.49	600.51		600.71	0.003541	4.02	305.98	188.39	0.41
Reid Branch Trib	843.95	2-Yr	622.00	595.49	599.11	599.11	599.81	0.019010	6.79	98.13	83.03	0.88

ExLynn1.rep

Reid Branch Trib	656.48	100-Yr	1951.50	593.72	603.06		603.14	0.000386	2.78	972.00	238.21	0.18
Reid Branch Trib	656.48	25-Yr	1478.30	593.72	602.31		602.38	0.000359	2.51	803.74	215.33	0.17
Reid Branch Trib	656.48	10-Yr	1168.60	593.72	601.48		601.55	0.000409	2.45	635.16	189.18	0.18
Reid Branch Trib	656.48	5-Yr	953.60	593.72	600.39		600.48	0.000622	2.64	453.93	151.57	0.21
Reid Branch Trib	656.48	2-Yr	622.00	593.72	598.43		598.61	0.002317	3.62	199.36	107.61	0.37
Reid Branch Trib	566.51	100-Yr	1951.50	593.79	603.03	598.10	603.11	0.000336	2.42	1045.21	328.73	0.16
Reid Branch Trib	566.51	25-Yr	1478.30	593.79	602.28	597.48	602.35	0.000318	2.18	824.25	268.60	0.15
Reid Branch Trib	566.51	10-Yr	1168.60	593.79	601.45	597.03	601.51	0.000362	2.12	624.12	213.33	0.16
Reid Branch Trib	566.51	5-Yr	953.60	593.79	600.23	596.70	600.41	0.000791	3.34	285.27	114.02	0.24
Reid Branch Trib	566.51	2-Yr	622.00	593.79	598.28	596.13	598.45	0.001319	3.29	189.34	81.64	0.30
Reid Branch Trib	533.93			Culvert								
Reid Branch Trib	518.66	100-Yr	1951.50	593.22	599.95	597.45	600.66	0.002825	6.74	289.51	152.61	0.47
Reid Branch Trib	518.66	25-Yr	1478.30	593.22	599.35	596.79	599.85	0.002254	5.64	262.25	107.38	0.41
Reid Branch Trib	518.66	10-Yr	1168.60	593.22	598.85	596.33	599.22	0.001915	4.89	239.17	86.43	0.38
Reid Branch Trib	518.66	5-Yr	953.60	593.22	598.41	595.98	598.71	0.001698	4.34	219.48	77.79	0.35
Reid Branch Trib	518.66	2-Yr	622.00	593.22	597.61	595.38	597.79	0.001330	3.40	182.77	62.05	0.30
Reid Branch Trib	485.57	100-Yr	1951.50	593.04	600.04		600.37	0.003236	4.94	469.40	165.38	0.39
Reid Branch Trib	485.57	25-Yr	1478.30	593.04	599.38		599.65	0.003080	4.38	376.04	120.39	0.37
Reid Branch Trib	485.57	10-Yr	1168.60	593.04	598.83		599.07	0.003195	4.08	312.89	110.58	0.37
Reid Branch Trib	485.57	5-Yr	953.60	593.04	598.37		598.59	0.003420	3.88	264.07	102.35	0.37
Reid Branch Trib	485.57	2-Yr	622.00	593.04	597.52		597.71	0.004125	3.51	183.90	87.17	0.39
Reid Branch Trib	331.24	100-Yr	1975.00	591.43	599.45		599.76	0.004766	4.53	451.20	137.61	0.38
Reid Branch Trib	331.24	25-Yr	1493.00	591.43	598.80		599.06	0.004716	4.09	368.68	118.24	0.37
Reid Branch Trib	331.24	10-Yr	1180.00	591.43	598.26		598.48	0.004594	3.77	312.98	91.92	0.36
Reid Branch Trib	331.24	5-Yr	963.00	591.43	597.79		597.98	0.004469	3.55	271.38	85.49	0.35
Reid Branch Trib	331.24	2-Yr	629.00	591.43	596.90		597.06	0.004245	3.13	201.00	73.57	0.33
Reid Branch Trib	31.74	100-Yr	1995.10	587.99	597.15	595.89	597.74	0.010011	6.75	363.58	131.59	0.52
Reid Branch Trib	31.74	25-Yr	1508.10	587.99	596.52	595.30	597.05	0.010016	6.21	287.12	111.81	0.51
Reid Branch Trib	31.74	10-Yr	1192.00	587.99	596.02	594.76	596.49	0.010007	5.75	235.03	94.08	0.50
Reid Branch Trib	31.74	5-Yr	972.60	587.99	595.61	594.34	596.03	0.010002	5.37	199.23	82.74	0.49
Reid Branch Trib	31.74	2-Yr	634.20	587.99	594.85	593.30	595.17	0.010000	4.62	143.41	64.06	0.47

Reid Branch Trib Reid Branch Trib

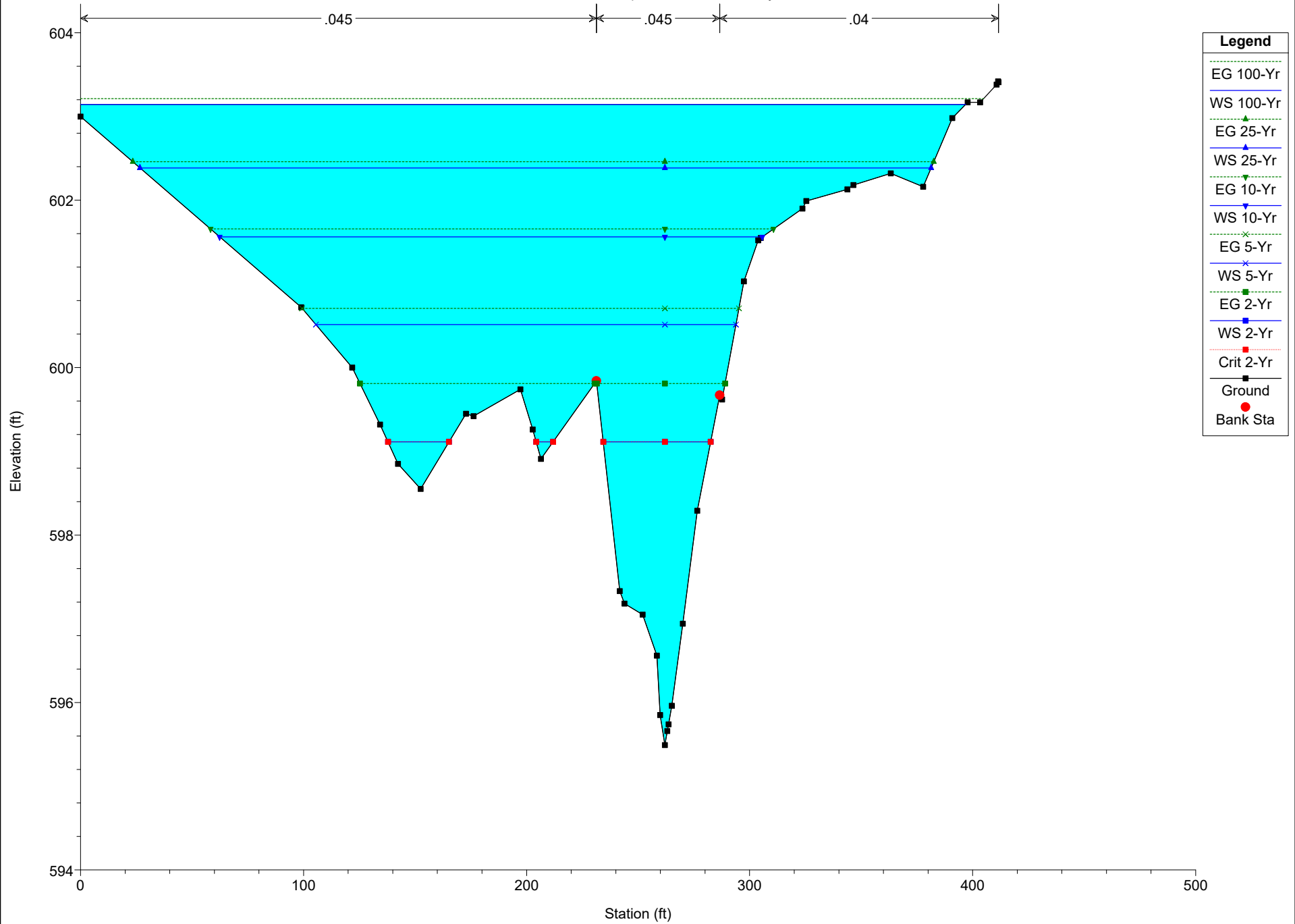


Legend	
EG 100-Yr	---▲---
WS 100-Yr	—▼—
EG 25-Yr	---▲---
WS 25-Yr	—▼—
EG 10-Yr	---▲---
WS 10-Yr	—▼—
Crit 100-Yr	---▲---
Crit 25-Yr	---▲---
EG 2-Yr	---▲---
WS 2-Yr	—▼—
Crit 10-Yr	---▲---
Crit 2-Yr	---▲---
Ground	—■—

**EXHIBIT C-3  
EXISTING CONDITIONS  
HEC-RAS PROFILE**

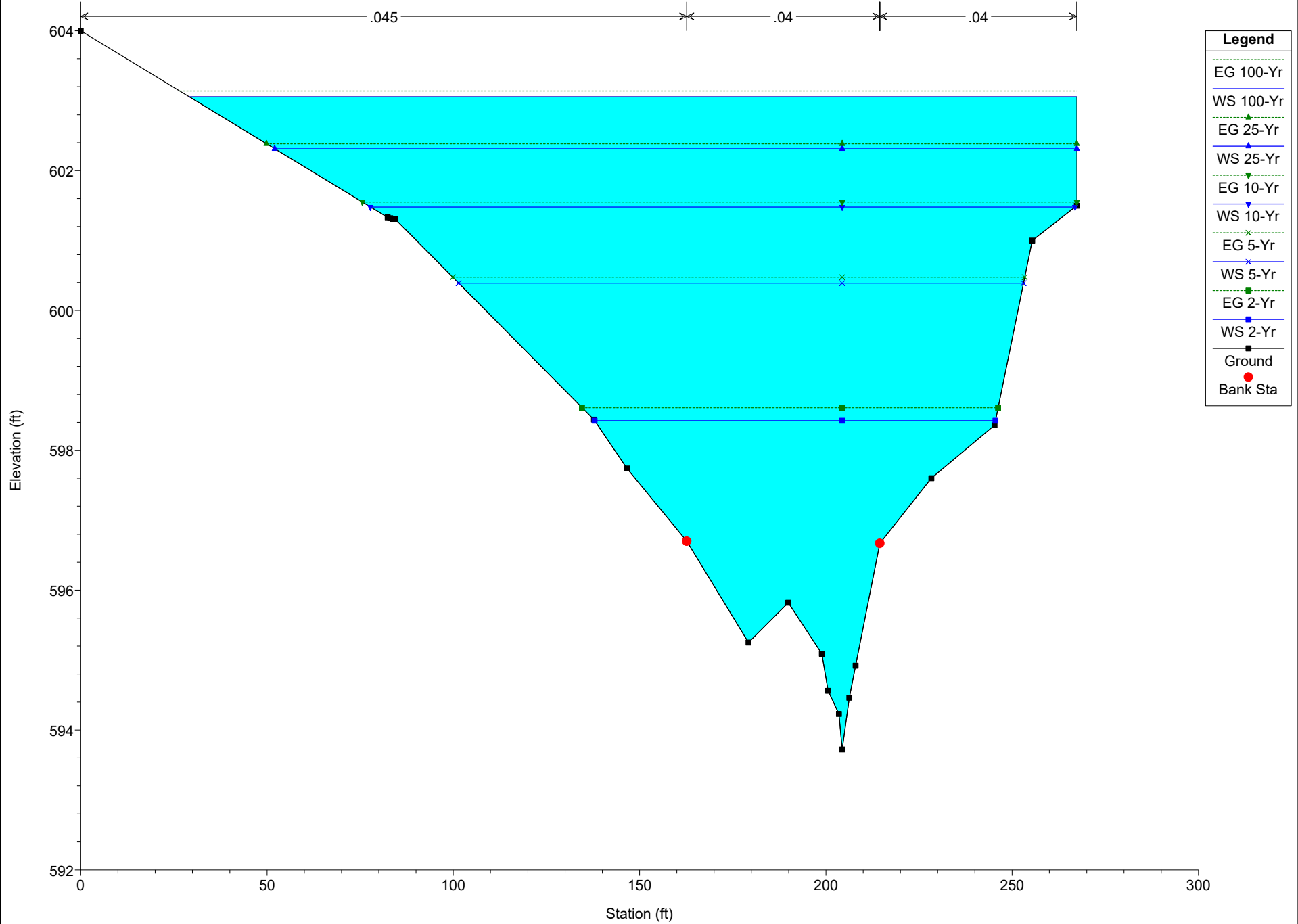
Reid Br Trib 1-Ex Lynn Plan: Plan 02 12/2/2021

RS = 843.95 Upstream Limit of Study



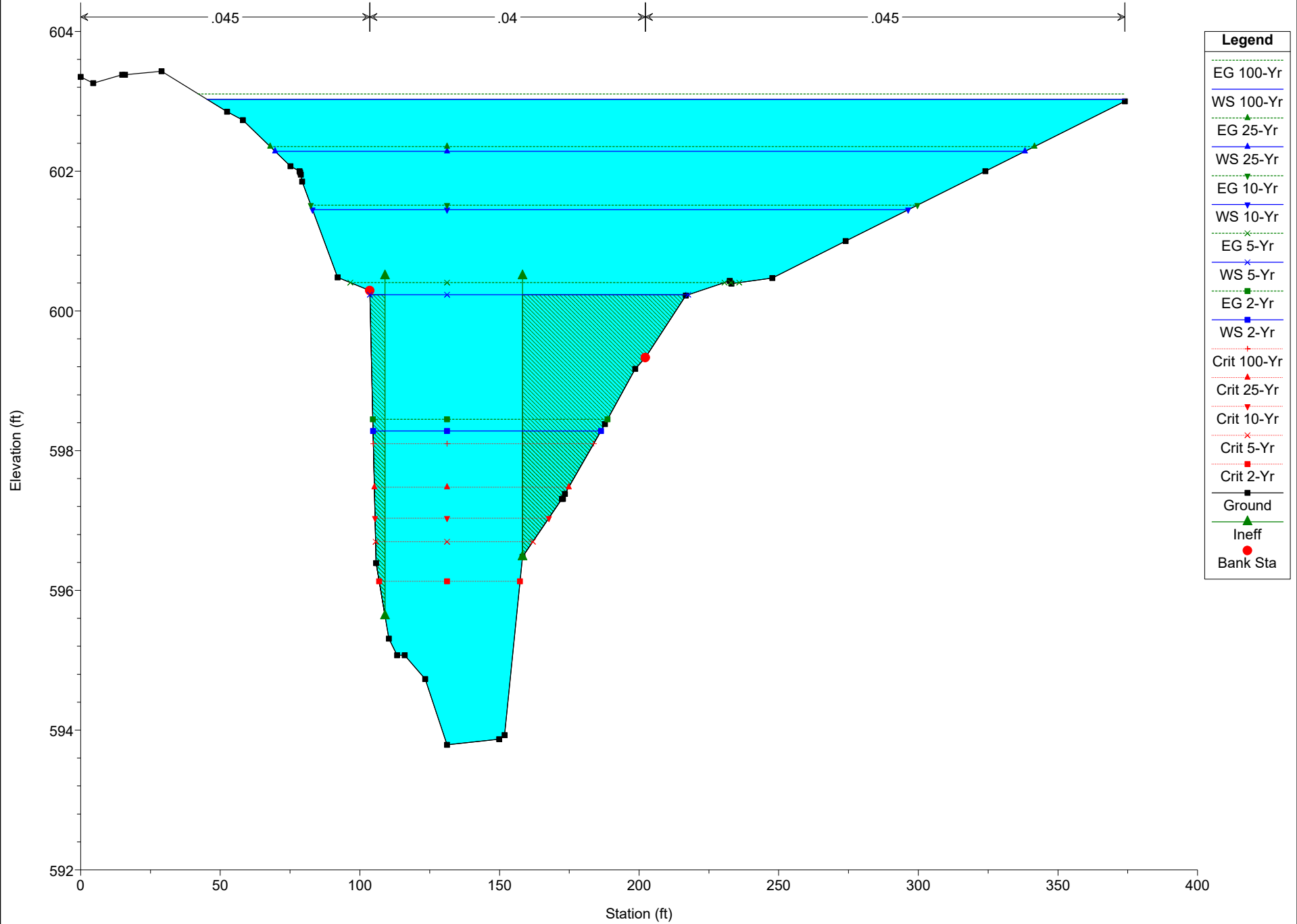
Reid Br Trib 1-Ex Lynn Plan: Plan 02 12/2/2021

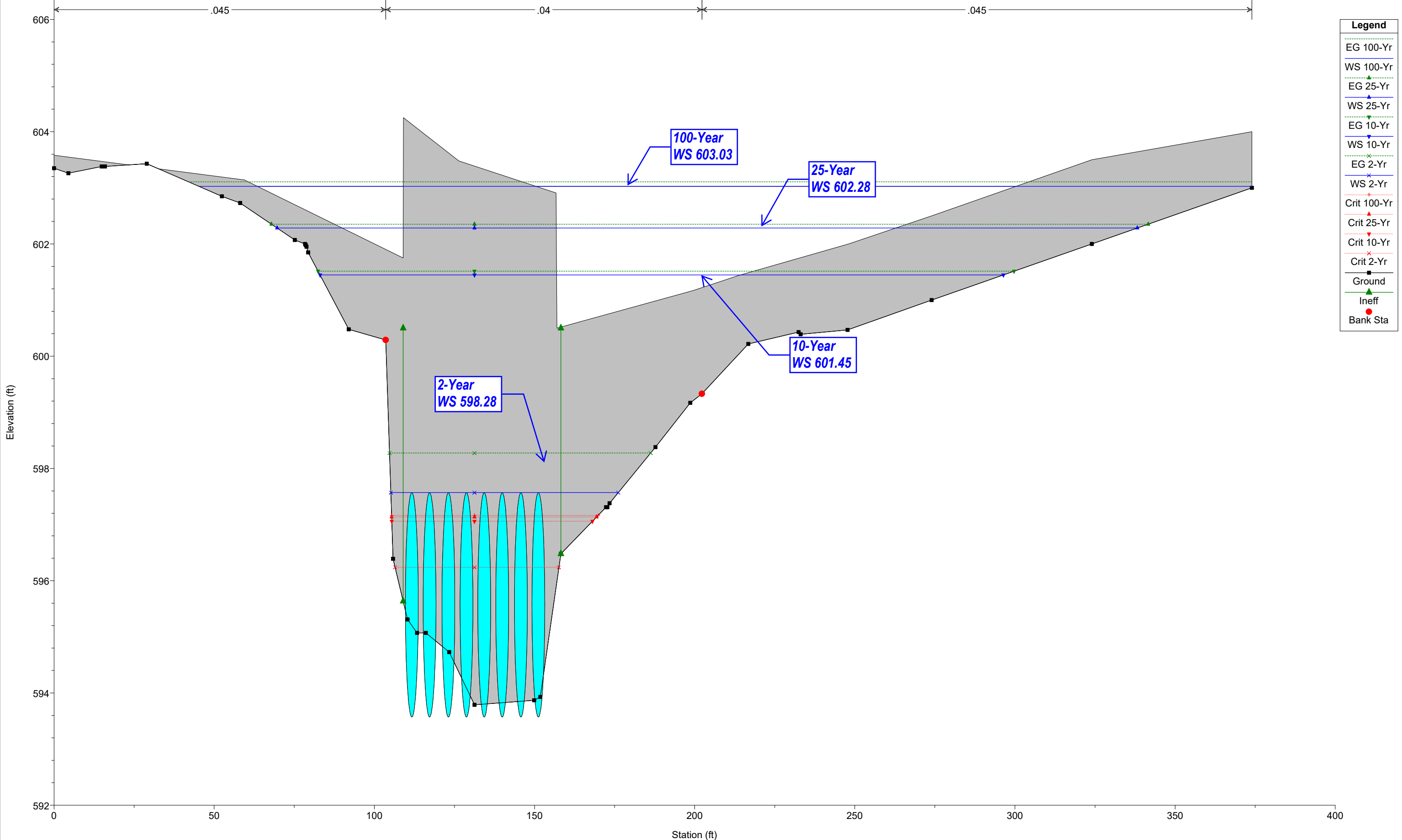
RS = 656.48



Reid Br Trib 1-Ex Lynn Plan: Plan 02 12/2/2021

RS = 566.51 Just US of Lynn Lane

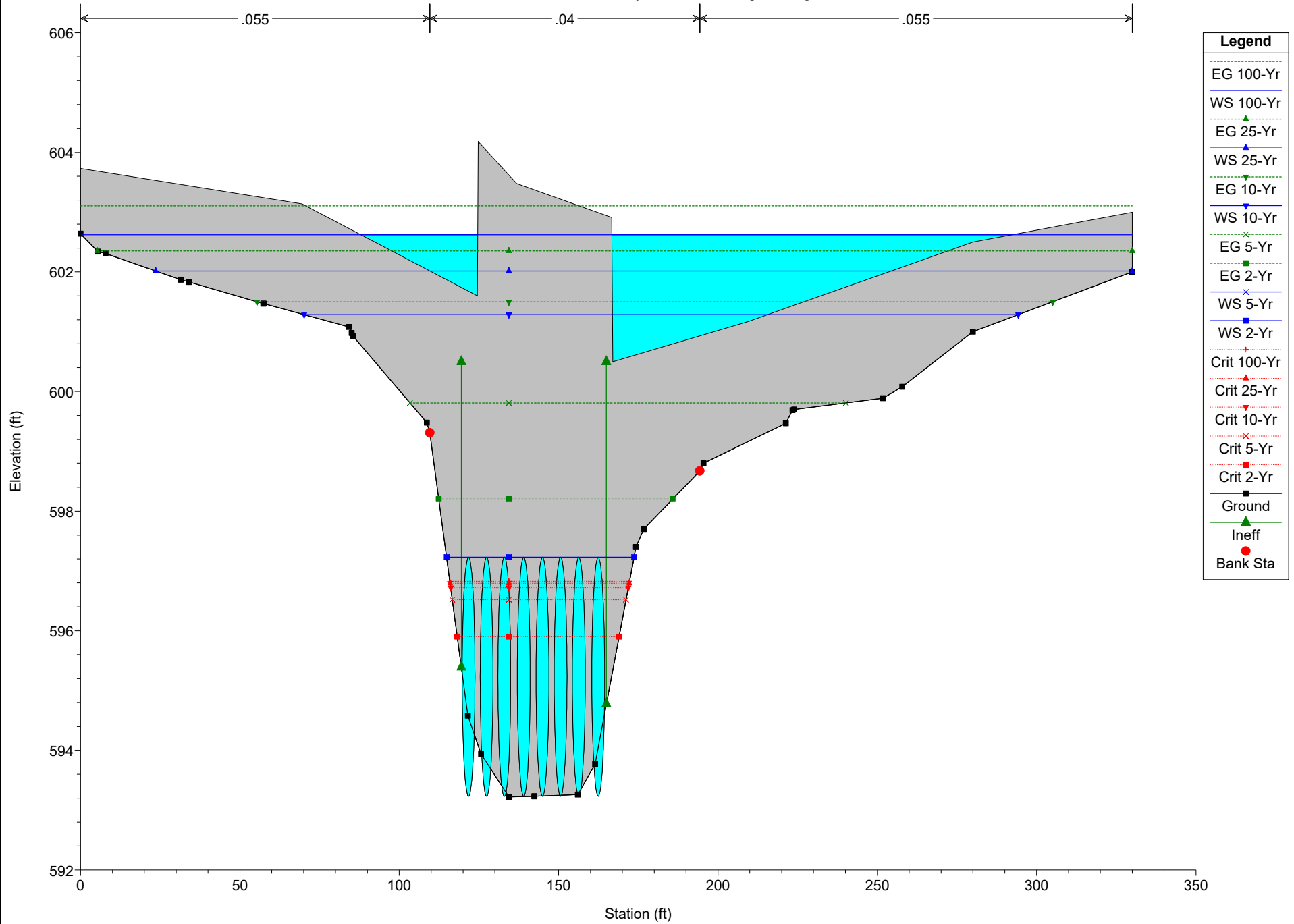




- Legend**
- EG 100-Yr
  - WS 100-Yr
  - EG 25-Yr
  - WS 25-Yr
  - EG 10-Yr
  - WS 10-Yr
  - EG 2-Yr
  - WS 2-Yr
  - Crit 100-Yr
  - Crit 25-Yr
  - Crit 10-Yr
  - Crit 2-Yr
  - Ground
  - Ineff
  - Bank Sta

Reid Br Trib 1-Ex Lynn Plan: Plan 02 12/2/2021

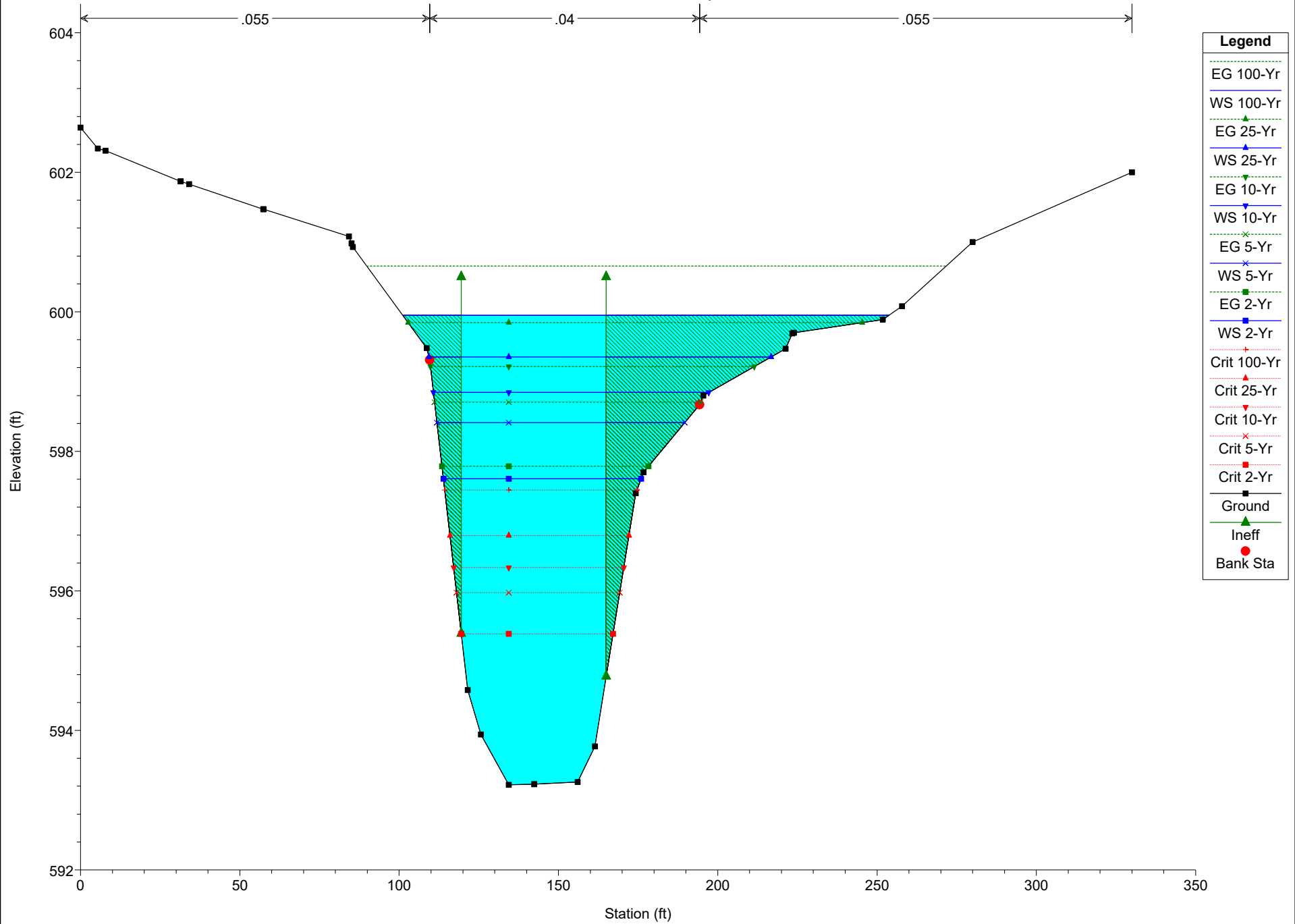
RS = 533.93 Culv Lynn Lane Crossing Existing



Legend	
EG 100-Yr	— (dotted green line)
WS 100-Yr	— (solid blue line)
EG 25-Yr	▲ (green triangle)
WS 25-Yr	▲ (blue triangle)
EG 10-Yr	▼ (green triangle)
WS 10-Yr	▼ (blue triangle)
EG 5-Yr	× (green cross)
EG 2-Yr	■ (green square)
WS 5-Yr	× (blue cross)
WS 2-Yr	■ (blue square)
Crit 100-Yr	+ (red plus)
Crit 25-Yr	▲ (red triangle)
Crit 10-Yr	▼ (red triangle)
Crit 5-Yr	× (red cross)
Crit 2-Yr	■ (red square)
Ground	— (solid black line)
Ineff	▲ (green triangle)
Bank Sta	● (red circle)

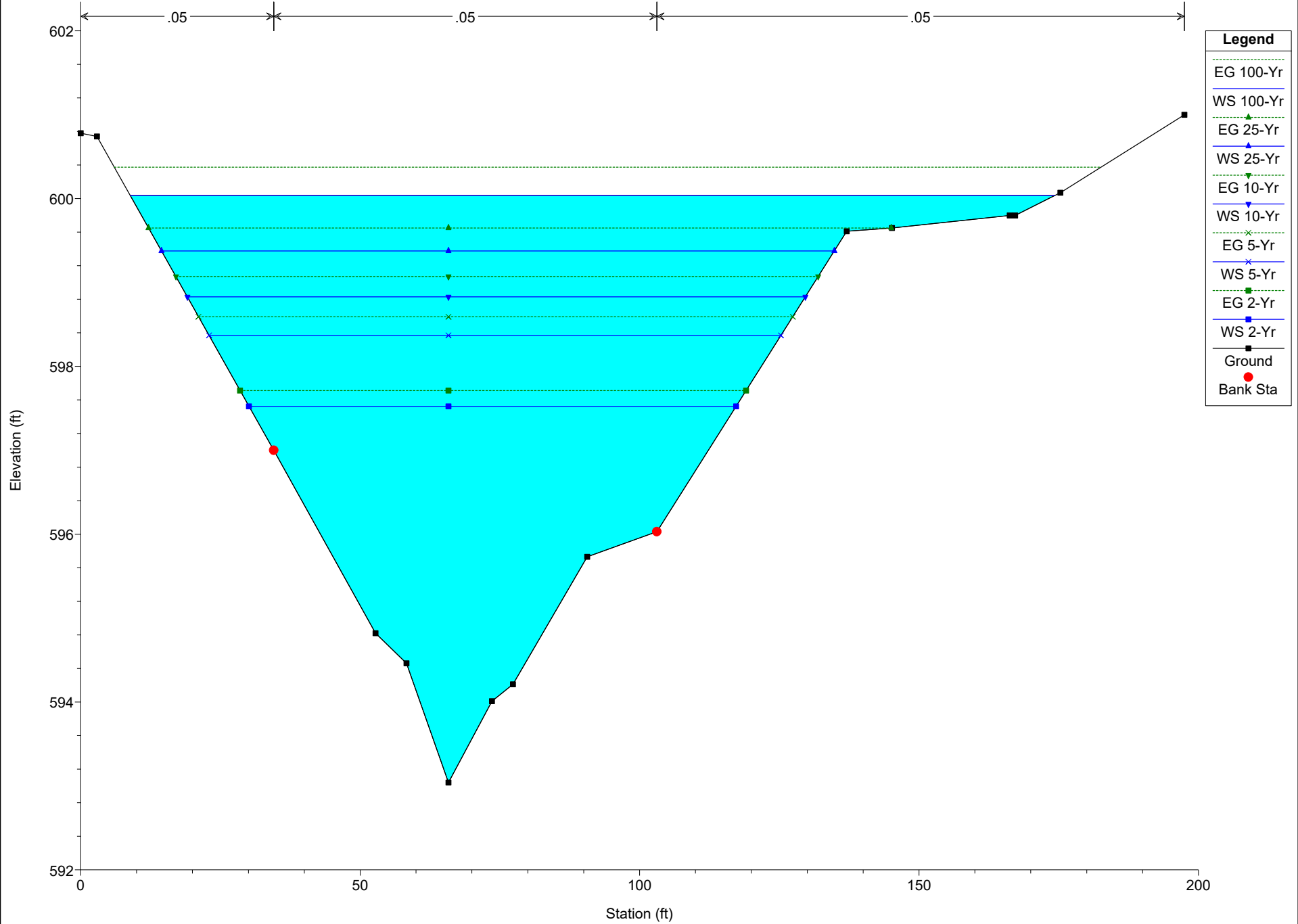
Reid Br Trib 1-Ex Lynn Plan: Plan 02 12/2/2021

RS = 518.66 Just DS of Lynn Lane



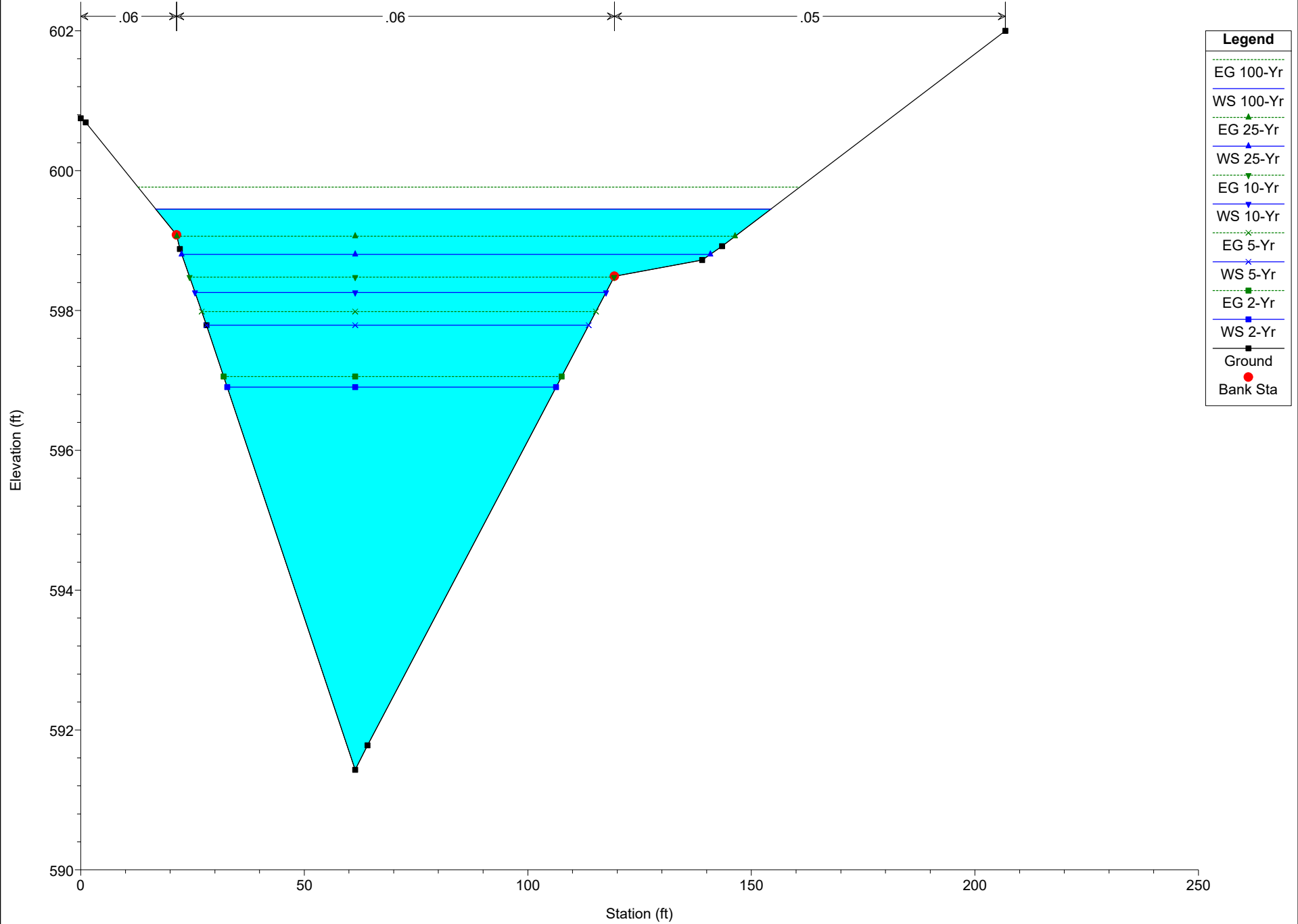
Reid Br Trib 1-Ex Lynn Plan: Plan 02 12/2/2021

RS = 485.57



Reid Br Trib 1-Ex Lynn Plan: Plan 02 12/2/2021

RS = 331.24

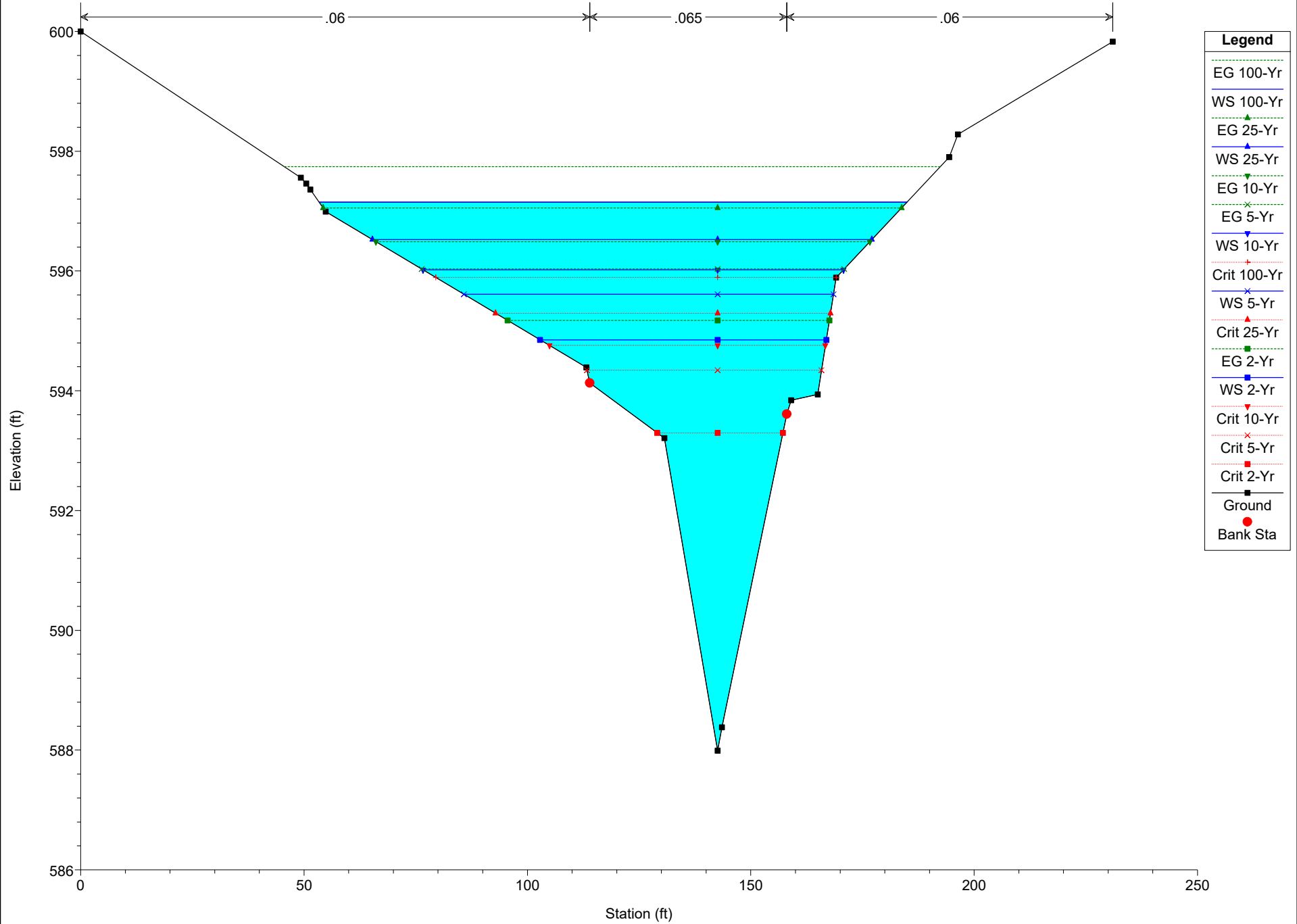


**Legend**

- EG 100-Yr
- WS 100-Yr
- EG 25-Yr
- WS 25-Yr
- EG 10-Yr
- WS 10-Yr
- EG 5-Yr
- WS 5-Yr
- EG 2-Yr
- WS 2-Yr
- Ground
- Bank Sta

Reid Br Trib 1-Ex Lynn Plan: Plan 02 12/2/2021

RS = 31.74



HEC-RAS HEC-RAS 5.0.3 September 2016  
U.S. Army Corps of Engineers  
Hydrologic Engineering Center  
609 Second Street  
Davis, California

```
X   X XXXXXX   XXXX   XXXX   XX   XXXX
X   X X       X   X       X X   X X   X
X   X X       X       X   X   X   X   X
XXXXXXXX XXXX   X       XXX XXXX   XXXXXX   XXXX
X   X X       X       X X   X   X       X
X   X X       X   X   X   X X   X   X   X
X   X XXXXXX   XXXX   X   X   X   X   XXXXX
```

PROJECT DATA

Project Title: Reid Br Trib 1-Pr Lynn  
Project File : PrLynn1.prj  
Run Date and Time: 11/18/2021 11:45:24 AM

Project in English units

PLAN DATA

Plan Title: PrBox-1  
Plan File : h:\Projects\Lucas\2021136 Lemontree-Kingswood Drainage\Engineering\HEC-RAS\PrLynn1.p03

Geometry Title: PrGeo-Lynn  
Geometry File : h:\Projects\Lucas\2021136 Lemontree-Kingswood Drainage\Engineering\HEC-RAS\PrLynn1.g02

Flow Title : EX-Multi  
Flow File : h:\Projects\Lucas\2021136 Lemontree-Kingswood Drainage\Engineering\HEC-RAS\PrLynn1.f02

Plan Description:

Preliminary Proposed Box Culverts

Plan Summary Information:

Number of: Cross Sections = 7 Multiple Openings = 0  
Culverts = 1 Inline Structures = 0  
Bridges = 0 Lateral Structures = 0

Computational Information

Water surface calculation tolerance = 0.01  
Critical depth calculation tolerance = 0.01  
Maximum number of iterations = 20  
Maximum difference tolerance = 0.3  
Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary  
Conveyance Calculation Method: At breaks in n values only  
Friction Slope Method: Average Conveyance

Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: EX-Multi  
 Flow File : h:\Projects\Lucas\2021136 Lemontree-Kingswood Drainage\Engineering\HEC-RAS\PrLynn1.f02

Flow Data (cfs)

River	Reach	RS	100-Yr	25-Yr	10-Yr	2-Yr
Reid Branch Trib	Reid Branch Trib	843.95	1951.5	1478.3	1168.6	622
Reid Branch Trib	Reid Branch Trib	485.57	1951.5	1478.3	1168.6	622
Reid Branch Trib	Reid Branch Trib	331.24	1975	1493	1180	629
Reid Branch Trib	Reid Branch Trib	31.74	1995.1	1508.1	1192	634.2

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Reid Branch Trib	Reid Branch Trib	100-Yr		Normal S = 0.01
Reid Branch Trib	Reid Branch Trib	25-Yr		Normal S = 0.01

GEOMETRY DATA

Geometry Title: PrGeo-Lynn  
 Geometry File : h:\Projects\Lucas\2021136 Lemontree-Kingswood Drainage\Engineering\HEC-RAS\PrLynn1.g02

CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 843.95

INPUT

Description: Upstream Limit of Study

Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	603	99	600.72	121.78	600	134.34	599.32	142.3	598.85
152.45	598.55	172.79	599.45	176.26	599.42	197.23	599.74	202.77	599.26
206.42	598.91	231.36	599.84	241.73	597.33	243.88	597.18	252.04	597.05
258.43	596.56	259.9	595.85	262.02	595.49	263.11	595.66	263.66	595.74
265.11	595.96	270.07	596.94	276.54	598.29	286.57	599.67	287.67	599.62
297.49	601.03	303.84	601.52	304.99	601.55	323.66	601.9	325.42	601.99
343.85	602.13	346.49	602.18	363.24	602.32	377.81	602.16	390.86	602.98
397.79	603.17	403.39	603.17	410.77	603.38	411.36	603.42	411.63	603.41

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	231.36	.045	286.57	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

231.36	286.57	50	187.47	230	.1	.3
--------	--------	----	--------	-----	----	----

## CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 656.48

## INPUT

Description:

Station Elevation Data		num=		21	
Sta	Elev	Sta	Elev	Sta	Elev
0	604	82.36	601.33	83.09	601.32
137.73	598.44	146.65	597.74	162.65	596.7
198.91	595.09	200.6	594.56	203.5	594.23
207.95	594.92	214.5	596.67	228.33	597.6
267.36	601.5				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	162.65	.04	214.5	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	162.65	214.5		150	89.97		.1	.3

## CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 566.51

## INPUT

Description: Just US of Lynn Lane

Station Elevation Data		num=		34	
Sta	Elev	Sta	Elev	Sta	Elev
0	603.35	4.47	603.26	14.9	603.38
52.41	602.85	58.12	602.73	75.17	602.07
78.82	601.95	79.33	601.85	92.01	600.48
110.37	595.31	114.76	593.79	131.53	593.79
158.22	596.48	172.35	597.31	172.74	597.31
198.64	599.17	202.27	599.33	216.75	600.22
247.73	600.47	274	601	324	602

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	103.55	.04	202.27	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	103.55	202.27		47.85	47.85		.3	.5

Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent		
0	109	600.5	F		
158.22	374	600.5	F		

## CULVERT

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 533.93

## INPUT

Description: Lynn Lane Crossing Existing

Distance from Upstream XS = 8

Deck/Roadway Width = 30.5

Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 13											
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	603.58	0	59.43	603.14	0	109	601.75	0			
109.1	604.25	0	126.36	603.48	0	156.72	602.91	0			
157	600.5	0	199.51	601.17	0	213.84	601.44	0			
248.06	602	0	274	602.5	0	324	603.5	0			
374	604	0									

Upstream Bridge Cross Section Data

Station Elevation Data num= 34									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	603.35	4.47	603.26	14.9	603.38	15.9	603.38	28.94	603.43
52.41	602.85	58.12	602.73	75.17	602.07	78.38	602	78.59	601.98
78.82	601.95	79.33	601.85	92.01	600.48	103.55	600.29	105.83	596.39
110.37	595.31	114.76	593.79	131.53	593.79	148.3	593.79	151.82	593.93
158.22	596.48	172.35	597.31	172.74	597.31	173.42	597.38	187.76	598.38
198.64	599.17	202.27	599.33	216.75	600.22	232.44	600.43	233.08	600.39
247.73	600.47	274	601	324	602	374	603		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	103.55	.04	202.27	.045

Bank Sta: Left Right Coeff Contr. Expan.

103.55	202.27	.3	.5
--------	--------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	109	600.5	F
158.22	374	600.5	F

Downstream Deck/Roadway Coordinates

num= 12											
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	603.73	0	69.47	603.14	0	124.49	601.6	0			
124.77	604.18	0	136.85	603.48	0	166.69	602.91	0			
166.97	600.5	0	209.48	601.17	0	223.81	601.44	0			
257.79	602.08	0	280	602.5	0	330	603	0			

Downstream Bridge Cross Section Data

Station Elevation Data num= 29									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	602.64	5.44	602.34	7.86	602.31	31.36	601.87	31.46	601.87
34.06	601.83	57.36	601.47	57.47	601.47	84.25	601.08	85.04	600.98
85.47	600.93	108.66	599.48	109.59	599.31	121.55	594.58	125.23	593.22
142	593.22	158.77	593.22	161.44	593.77	174.28	597.4	176.72	597.7
194.32	598.67	195.45	598.8	221.27	599.47	223.41	599.69	223.91	599.7
251.78	599.89	257.79	600.08	280	601	330	602		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	109.59	.04	194.32	.055

Bank Sta: Left Right Coeff Contr. Expan.

109.59	194.32	.3	.5
Ineffective Flow	num=	2	
Sta L	Sta R	Elev	Permanent
0	119.5	600.5	F
165	330	600.5	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
Maximum allowable submergence for weir flow = .98  
Elevation at which weir flow begins = 600.41  
Energy head used in spillway design =  
Spillway height used in design =  
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Prop Boxes	Box	5	10

FHWA Chart # 8 - flared wingwalls  
FHWA Scale # 2 - Wingwall flared 90 or 15 deg.  
Solution Criteria = Highest U.S. EG  
Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef

4	40	.012	.012	0	.5	1
---	----	------	------	---	----	---

Number of Barrels = 3

Upstream Elevation = 593.75

Centerline Stations

Sta.	Sta.	Sta.
120.35	131.53	142.71

Downstream Elevation = 593.26

Centerline Stations

Sta.	Sta.	Sta.
130.82	142	153.18

CULVERT OUTPUT Profile #100-Yr Culv Group: Prop Boxes

Q Culv Group (cfs)	1543.13	Culv Full Len (ft)	40.00
# Barrels	3	Culv Vel US (ft/s)	10.29
Q Barrel (cfs)	514.38	Culv Vel DS (ft/s)	10.29
E.G. US. (ft)	602.57	Culv Inv El Up (ft)	593.75
W.S. US. (ft)	602.47	Culv Inv El Dn (ft)	593.26
E.G. DS (ft)	600.64	Culv Frctn Ls (ft)	0.14
W.S. DS (ft)	599.96	Culv Exit Loss (ft)	0.97
Delta EG (ft)	1.93	Culv Entr Loss (ft)	0.82
Delta WS (ft)	2.50	Q Weir (cfs)	408.37
E.G. IC (ft)	602.41	Weir Sta Lft (ft)	79.75
E.G. OC (ft)	602.57	Weir Sta Rgt (ft)	277.51
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	598.75	Weir Max Depth (ft)	2.07
Culv WS Outlet (ft)	598.26	Weir Avg Depth (ft)	0.94
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	141.68
Culv Crt Depth (ft)	4.35	Min El Weir Flow (ft)	600.51

CULVERT OUTPUT Profile #25-Yr Culv Group: Prop Boxes

Q Culv Group (cfs)	1409.68	Culv Full Len (ft)	40.00
# Barrels	3	Culv Vel US (ft/s)	9.40
Q Barrel (cfs)	469.89	Culv Vel DS (ft/s)	9.40
E.G. US. (ft)	601.54	Culv Inv El Up (ft)	593.75

W.S. US. (ft)	601.43	Culv Inv El Dn (ft)	593.26
E.G. DS (ft)	599.83	Culv Frctn Ls (ft)	0.12
W.S. DS (ft)	599.36	Culv Exit Loss (ft)	0.90
Delta EG (ft)	1.71	Culv Entr Loss (ft)	0.69
Delta WS (ft)	2.07	Q Weir (cfs)	68.62
E.G. IC (ft)	601.37	Weir Sta Lft (ft)	156.88
E.G. OC (ft)	601.54	Weir Sta Rgt (ft)	219.46
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	598.75	Weir Max Depth (ft)	1.03
Culv WS Outlet (ft)	598.26	Weir Avg Depth (ft)	0.53
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	33.21
Culv Crt Depth (ft)	4.09	Min El Weir Flow (ft)	600.51

## CULVERT OUTPUT Profile #10-Yr Culv Group: Prop Boxes

Q Culv Group (cfs)	1168.60	Culv Full Len (ft)	40.00
# Barrels	3	Culv Vel US (ft/s)	7.79
Q Barrel (cfs)	389.53	Culv Vel DS (ft/s)	7.79
E.G. US. (ft)	600.35	Culv Inv El Up (ft)	593.75
W.S. US. (ft)	600.10	Culv Inv El Dn (ft)	593.26
E.G. DS (ft)	599.20	Culv Frctn Ls (ft)	0.08
W.S. DS (ft)	598.85	Culv Exit Loss (ft)	0.59
Delta EG (ft)	1.14	Culv Entr Loss (ft)	0.47
Delta WS (ft)	1.25	Q Weir (cfs)	
E.G. IC (ft)	599.92	Weir Sta Lft (ft)	
E.G. OC (ft)	600.35	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	598.75	Weir Max Depth (ft)	
Culv WS Outlet (ft)	598.26	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.61	Min El Weir Flow (ft)	600.51

## CULVERT OUTPUT Profile #2-Yr Culv Group: Prop Boxes

Q Culv Group (cfs)	622.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	5.50
Q Barrel (cfs)	207.33	Culv Vel DS (ft/s)	4.76
E.G. US. (ft)	598.23	Culv Inv El Up (ft)	593.75
W.S. US. (ft)	598.07	Culv Inv El Dn (ft)	593.26
E.G. DS (ft)	597.78	Culv Frctn Ls (ft)	0.08
W.S. DS (ft)	597.62	Culv Exit Loss (ft)	0.18
Delta EG (ft)	0.44	Culv Entr Loss (ft)	0.23
Delta WS (ft)	0.45	Q Weir (cfs)	
E.G. IC (ft)	597.76	Weir Sta Lft (ft)	
E.G. OC (ft)	598.23	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	597.52	Weir Max Depth (ft)	
Culv WS Outlet (ft)	597.62	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.42	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.37	Min El Weir Flow (ft)	600.51

## CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 518.66

## INPUT

Description: Just DS of Lynn Lane

Station Elevation Data num= 29									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	602.64	5.44	602.34	7.86	602.31	31.36	601.87	31.46	601.87
34.06	601.83	57.36	601.47	57.47	601.47	84.25	601.08	85.04	600.98
85.47	600.93	108.66	599.48	109.59	599.31	121.55	594.58	125.23	593.22
142	593.22	158.77	593.22	161.44	593.77	174.28	597.4	176.72	597.7
194.32	598.67	195.45	598.8	221.27	599.47	223.41	599.69	223.91	599.7
251.78	599.89	257.79	600.08	280	601	330	602		

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	109.59	.04	194.32	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	109.59	194.32		33.09	33.09		.3	.5

Ineffective Flow num= 2			
Sta L	Sta R	Elev	Permanent
0	119.5	600.5	F
165	330	600.5	F

## CROSS SECTION

RIVER: Reid Branch Trib

REACH: Reid Branch Trib RS: 485.57

## INPUT

Description:

Station Elevation Data num= 16									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	600.78	2.92	600.74	34.54	597	52.76	594.82	58.27	594.46
65.81	593.04	73.58	594.01	77.34	594.21	90.64	595.73	103.1	596.03
137.06	599.61	145.16	599.65	166.24	599.8	167.19	599.8	175.28	600.07
197.5	601								

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	34.54	.05	103.1	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	34.54	103.1		154.33	154.33		.1	.3

## CROSS SECTION

RIVER: Reid Branch Trib

REACH: Reid Branch Trib RS: 331.24

## INPUT

Description:

Station Elevation Data num= 11									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	600.75	1.11	600.69	21.43	599.08	22.16	598.88	28.12	597.79
61.38	591.43	64.13	591.78	119.4	598.49	138.98	598.72	143.46	598.92
206.82	602								

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .06 21.43 .06 119.4 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 21.43 119.4 250 299.5 350 .1 .3

CROSS SECTION

RIVER: Reid Branch Trib  
 REACH: Reid Branch Trib RS: 31.74

INPUT

Description:

Station Elevation Data num= 17  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 0 600 49.28 597.56 50.49 597.46 51.43 597.36 54.85 596.99  
 113.19 594.39 113.96 594.13 130.65 593.21 142.56 587.99 143.55 588.38  
 158.06 593.61 159.02 593.84 164.97 593.94 169.11 595.89 194.43 597.9  
 196.37 598.28 231.01 599.83

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .06 113.96 .065 158.06 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 113.96 158.06 0 0 0 .1 .3

SUMMARY OF MANNING'S N VALUES

River:Reid Branch Trib

Reach	River Sta.	n1	n2	n3
Reid Branch Trib	843.95	.045	.045	.04
Reid Branch Trib	656.48	.045	.04	.04
Reid Branch Trib	566.51	.045	.04	.045
Reid Branch Trib	533.93	Culvert		
Reid Branch Trib	518.66	.055	.04	.055
Reid Branch Trib	485.57	.05	.05	.05
Reid Branch Trib	331.24	.06	.06	.05
Reid Branch Trib	31.74	.06	.065	.06

SUMMARY OF REACH LENGTHS

River: Reid Branch Trib

Reach	River Sta.	Left	Channel	Right
Reid Branch Trib	843.95	50	187.47	230
Reid Branch Trib	656.48	150	89.97	50
Reid Branch Trib	566.51	47.85	47.85	47.85
Reid Branch Trib	533.93	Culvert		

Reid Branch Trib	518.66	33.09	33.09	33.09
Reid Branch Trib	485.57	154.33	154.33	154.33
Reid Branch Trib	331.24	250	299.5	350
Reid Branch Trib	31.74	0	0	0

## SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Reid Branch Trib

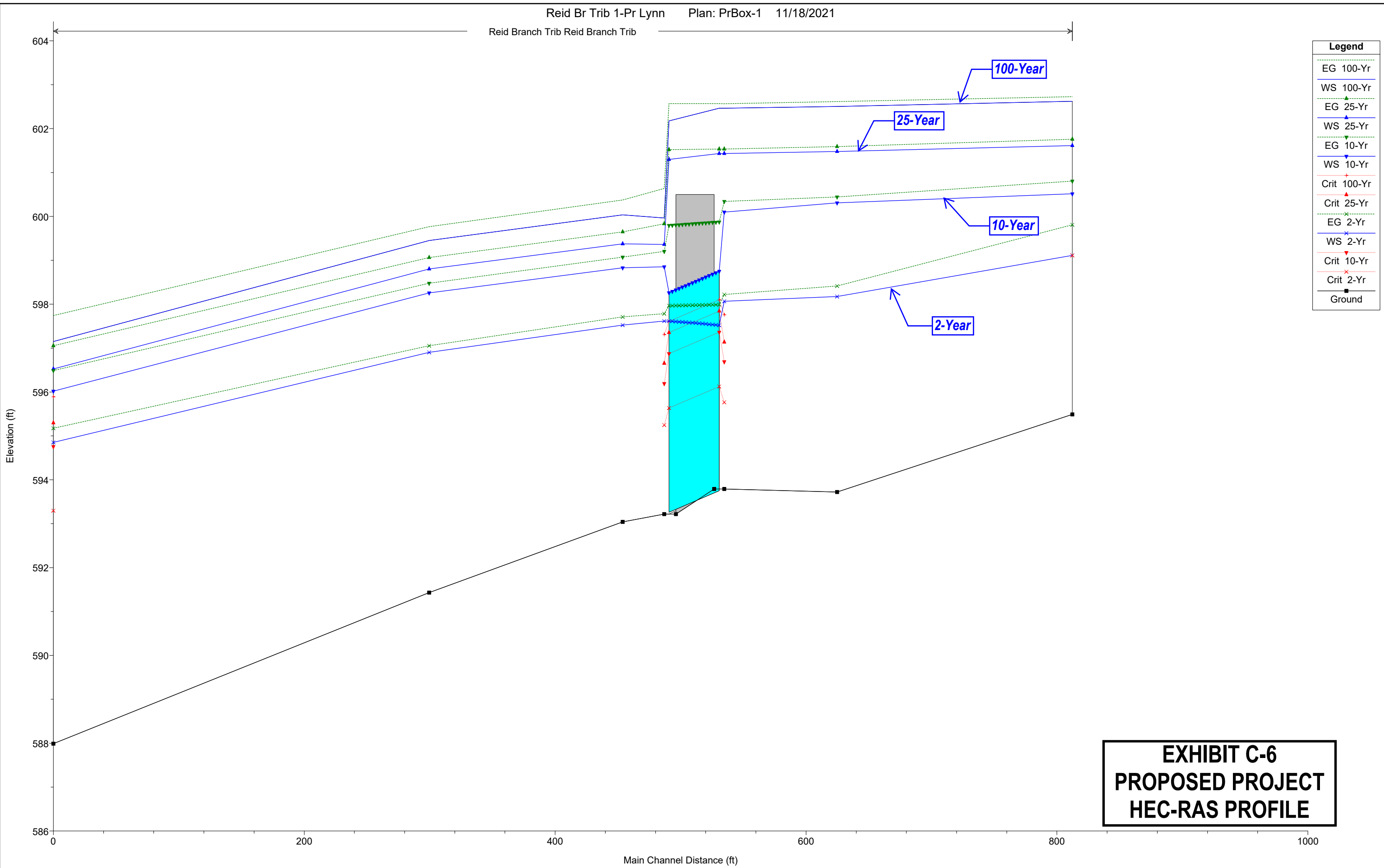
Reach	River Sta.	Contr.	Expan.
Reid Branch Trib	843.95	.1	.3
Reid Branch Trib	656.48	.1	.3
Reid Branch Trib	566.51	.3	.5
Reid Branch Trib	533.93	Culvert	
Reid Branch Trib	518.66	.3	.5
Reid Branch Trib	485.57	.1	.3
Reid Branch Trib	331.24	.1	.3
Reid Branch Trib	31.74	.1	.3

## Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reid Branch Trib	843.95	100-Yr	1951.50	595.49	602.62		602.73	0.001130	3.25	853.89	368.71	0.25
Reid Branch Trib	843.95	25-Yr	1478.30	595.49	601.61		601.76	0.001928	3.66	541.98	248.07	0.32
Reid Branch Trib	843.95	10-Yr	1168.60	595.49	600.51		600.81	0.005314	4.93	306.05	188.40	0.50
Reid Branch Trib	843.95	2-Yr	622.00	595.49	599.11	599.11	599.81	0.019010	6.79	98.13	83.03	0.88
Reid Branch Trib	656.48	100-Yr	1951.50	593.72	602.51		602.62	0.000550	3.16	845.65	221.25	0.21
Reid Branch Trib	656.48	25-Yr	1478.30	593.72	601.48		601.59	0.000654	3.10	634.96	189.12	0.22
Reid Branch Trib	656.48	10-Yr	1168.60	593.72	600.31		600.44	0.001006	3.32	441.43	149.71	0.27
Reid Branch Trib	656.48	2-Yr	622.00	593.72	598.18		598.42	0.003310	4.08	173.38	100.09	0.44
Reid Branch Trib	566.51	100-Yr	1951.50	593.79	602.47	597.76	602.57	0.000453	2.70	891.04	282.35	0.19
Reid Branch Trib	566.51	25-Yr	1478.30	593.79	601.43	597.14	601.53	0.000531	2.61	637.82	212.45	0.20
Reid Branch Trib	566.51	10-Yr	1168.60	593.79	600.10	596.69	600.34	0.001061	3.95	295.52	111.10	0.28
Reid Branch Trib	566.51	2-Yr	622.00	593.79	598.07	595.77	598.22	0.001191	3.18	195.50	78.40	0.28
Reid Branch Trib	533.93											
Reid Branch Trib	518.66	100-Yr	1951.50	593.22	599.96	597.31	600.64	0.002632	6.59	296.24	153.19	0.46
Reid Branch Trib	518.66	25-Yr	1478.30	593.22	599.36	596.65	599.83	0.002088	5.50	268.80	107.75	0.40
Reid Branch Trib	518.66	10-Yr	1168.60	593.22	598.85	596.19	599.20	0.001763	4.76	245.61	86.67	0.36
Reid Branch Trib	518.66	2-Yr	622.00	593.22	597.62	595.25	597.78	0.001187	3.28	189.44	62.17	0.28
Reid Branch Trib	485.57	100-Yr	1951.50	593.04	600.04		600.37	0.003236	4.94	469.40	165.38	0.39
Reid Branch Trib	485.57	25-Yr	1478.30	593.04	599.38		599.65	0.003080	4.38	376.04	120.39	0.37
Reid Branch Trib	485.57	10-Yr	1168.60	593.04	598.83		599.07	0.003195	4.08	312.89	110.58	0.37
Reid Branch Trib	485.57	2-Yr	622.00	593.04	597.52		597.71	0.004125	3.51	183.90	87.17	0.39
Reid Branch Trib	331.24	100-Yr	1975.00	591.43	599.45		599.76	0.004766	4.53	451.20	137.61	0.38
Reid Branch Trib	331.24	25-Yr	1493.00	591.43	598.80		599.06	0.004716	4.09	368.68	118.24	0.37
Reid Branch Trib	331.24	10-Yr	1180.00	591.43	598.26		598.48	0.004594	3.77	312.98	91.92	0.36

PrLynn1.rep												
Reid Branch Trib	331.24	2-Yr	629.00	591.43	596.90		597.06	0.004245	3.13	201.00	73.57	0.33
Reid Branch Trib	31.74	100-Yr	1995.10	587.99	597.15	595.89	597.74	0.010011	6.75	363.58	131.59	0.52
Reid Branch Trib	31.74	25-Yr	1508.10	587.99	596.52	595.30	597.05	0.010016	6.21	287.12	111.81	0.51
Reid Branch Trib	31.74	10-Yr	1192.00	587.99	596.02	594.76	596.49	0.010007	5.75	235.03	94.08	0.50
Reid Branch Trib	31.74	2-Yr	634.20	587.99	594.85	593.30	595.17	0.010000	4.62	143.41	64.06	0.47

Reid Branch Trib Reid Branch Trib

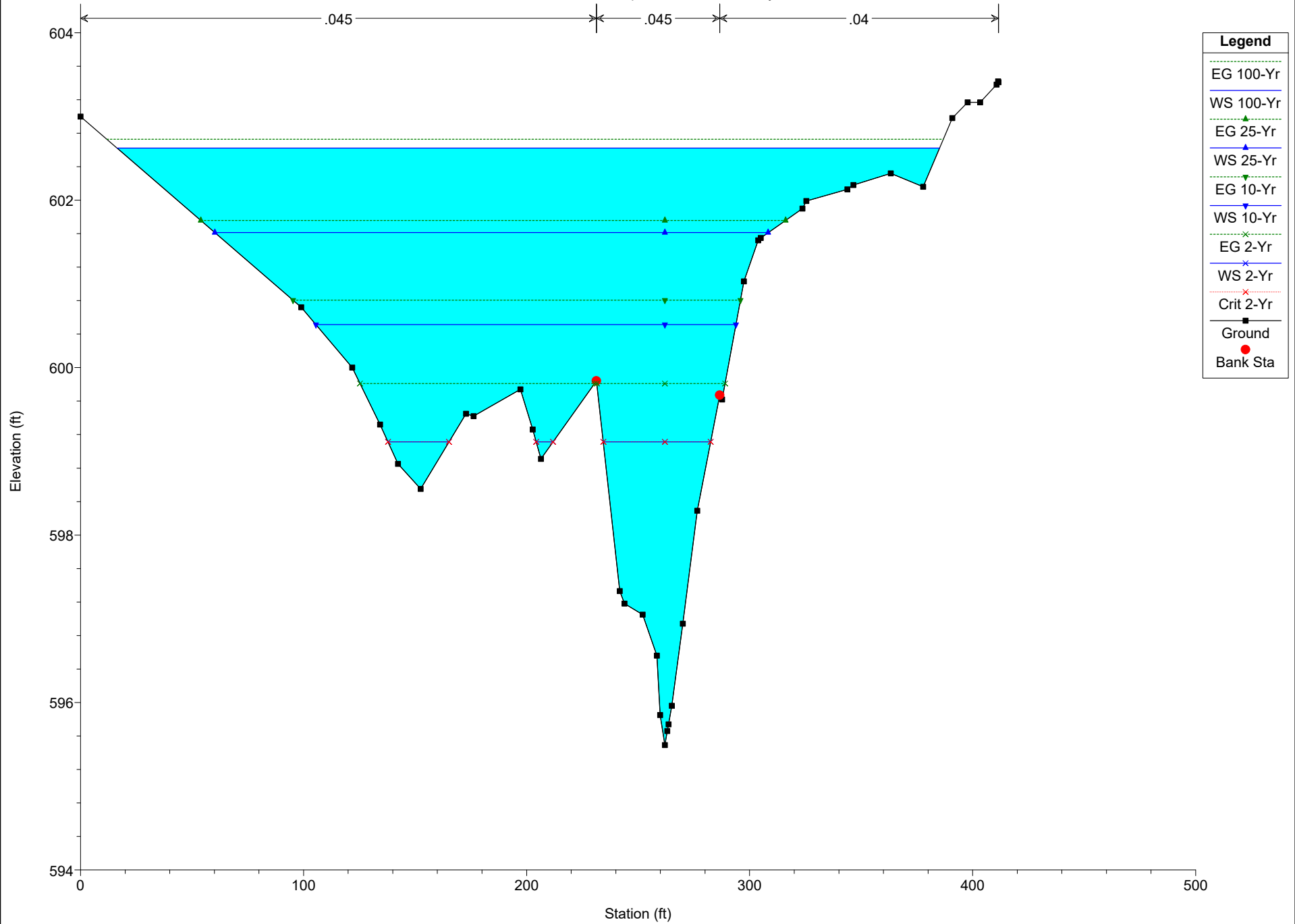


Legend	
EG 100-Yr	(Dotted Green Line)
WS 100-Yr	(Solid Blue Line)
EG 25-Yr	(Dotted Green Line)
WS 25-Yr	(Solid Blue Line)
EG 10-Yr	(Dotted Green Line)
WS 10-Yr	(Solid Blue Line)
Crit 100-Yr	(Red Line with +)
Crit 25-Yr	(Red Line with ^)
EG 2-Yr	(Dotted Green Line)
WS 2-Yr	(Solid Blue Line)
Crit 10-Yr	(Red Line with v)
Crit 2-Yr	(Red Line with x)
Ground	(Solid Black Line)

**EXHIBIT C-6  
PROPOSED PROJECT  
HEC-RAS PROFILE**

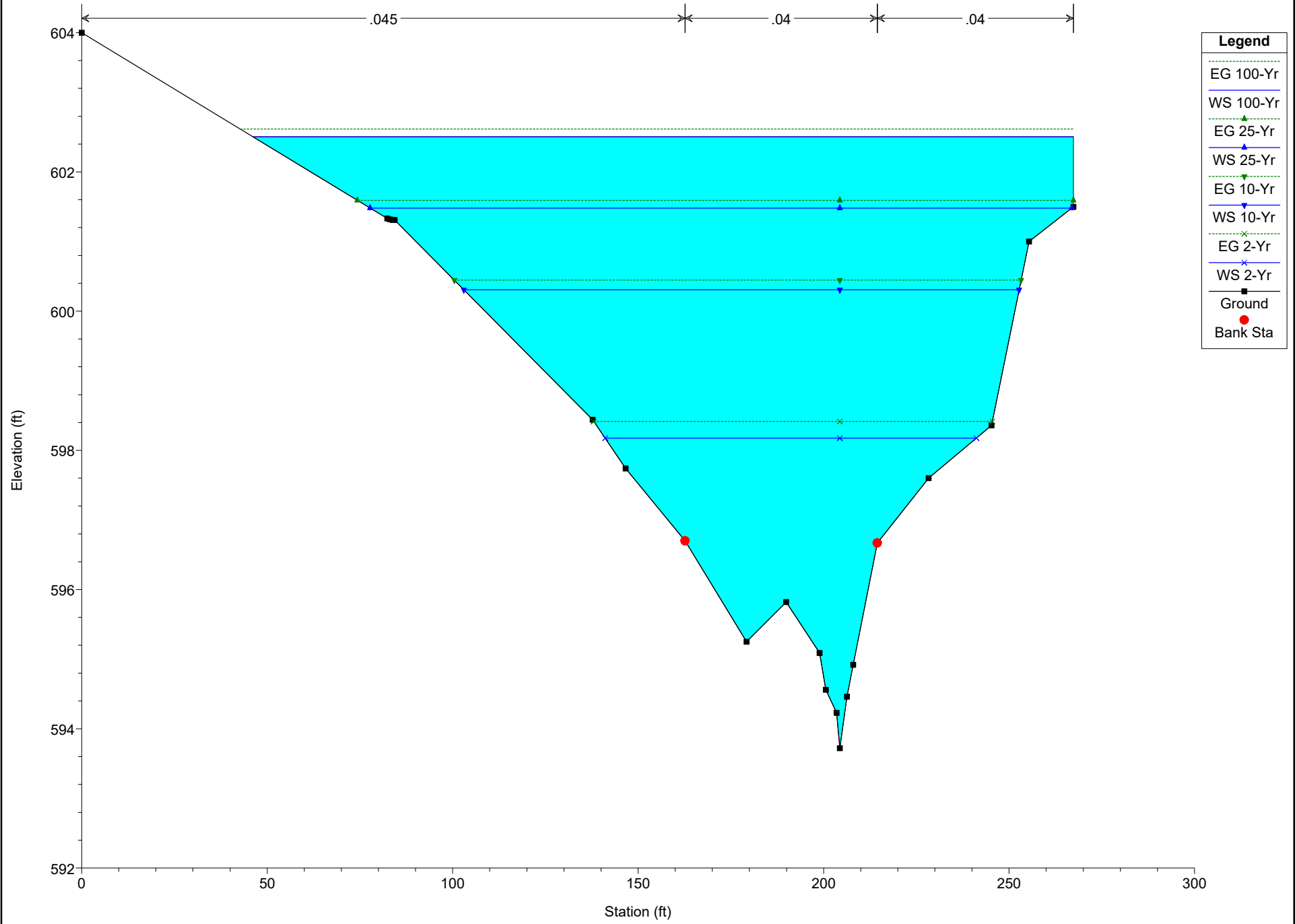
Reid Br Trib 1-Pr Lynn Plan: PrBox-1 11/18/2021

RS = 843.95 Upstream Limit of Study



Reid Br Trib 1-Pr Lynn Plan: PrBox-1 11/18/2021

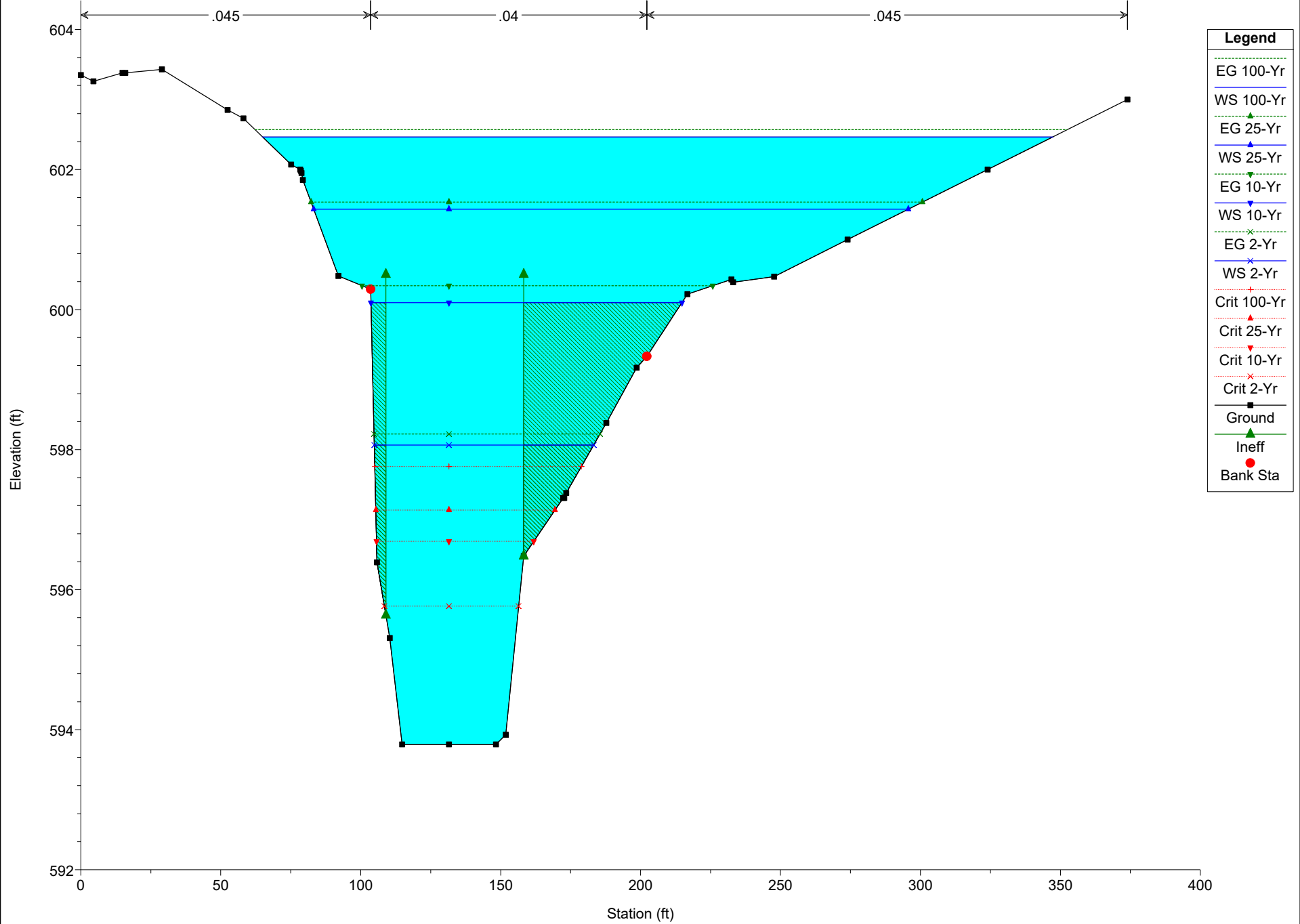
RS = 656.48

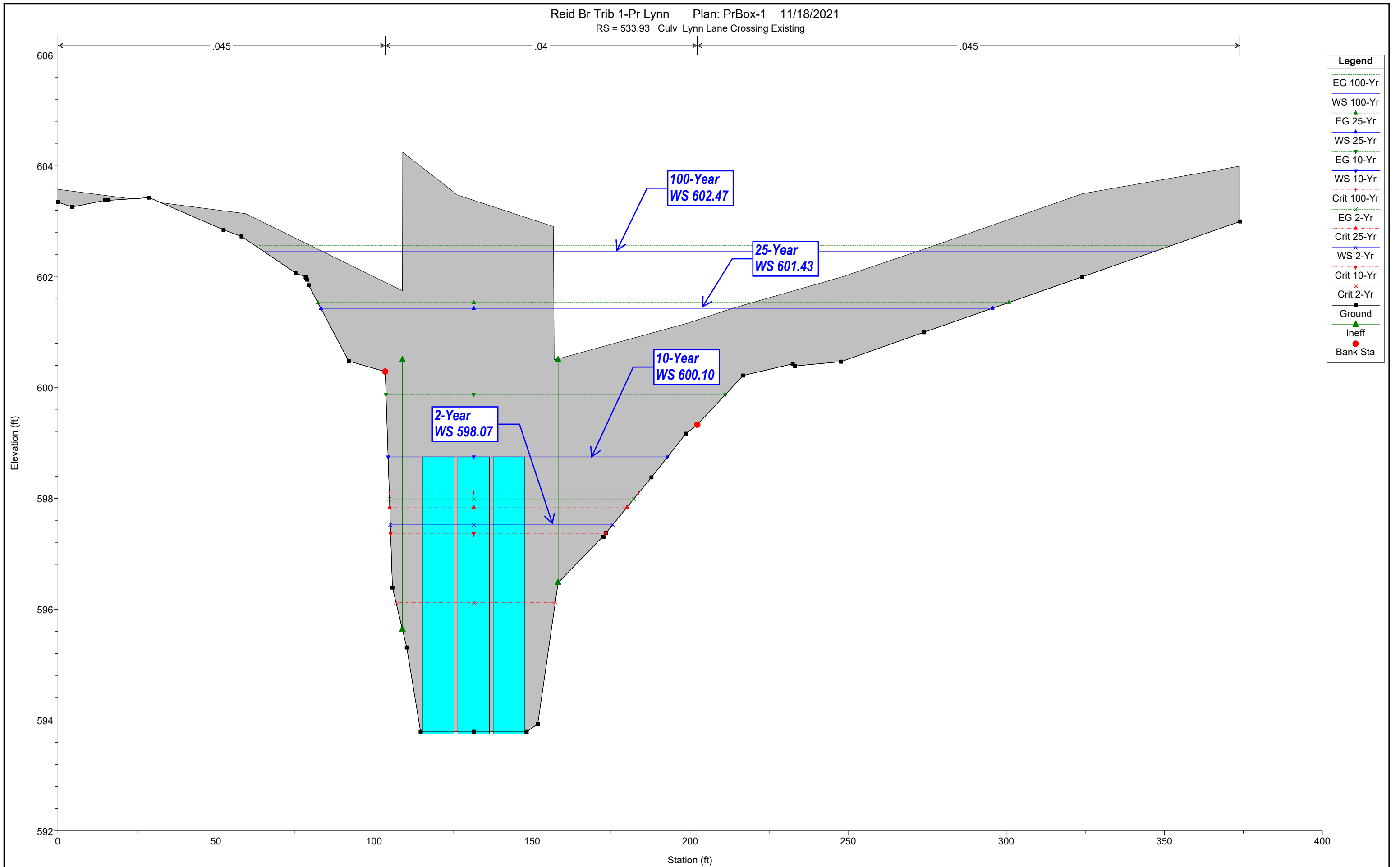


- Legend**
- EG 100-Yr
  - WS 100-Yr
  - EG 25-Yr
  - WS 25-Yr
  - EG 10-Yr
  - WS 10-Yr
  - EG 2-Yr
  - WS 2-Yr
  - Ground
  - Bank Sta

Reid Br Trib 1-Pr Lynn Plan: PrBox-1 11/18/2021

RS = 566.51 Just US of Lynn Lane



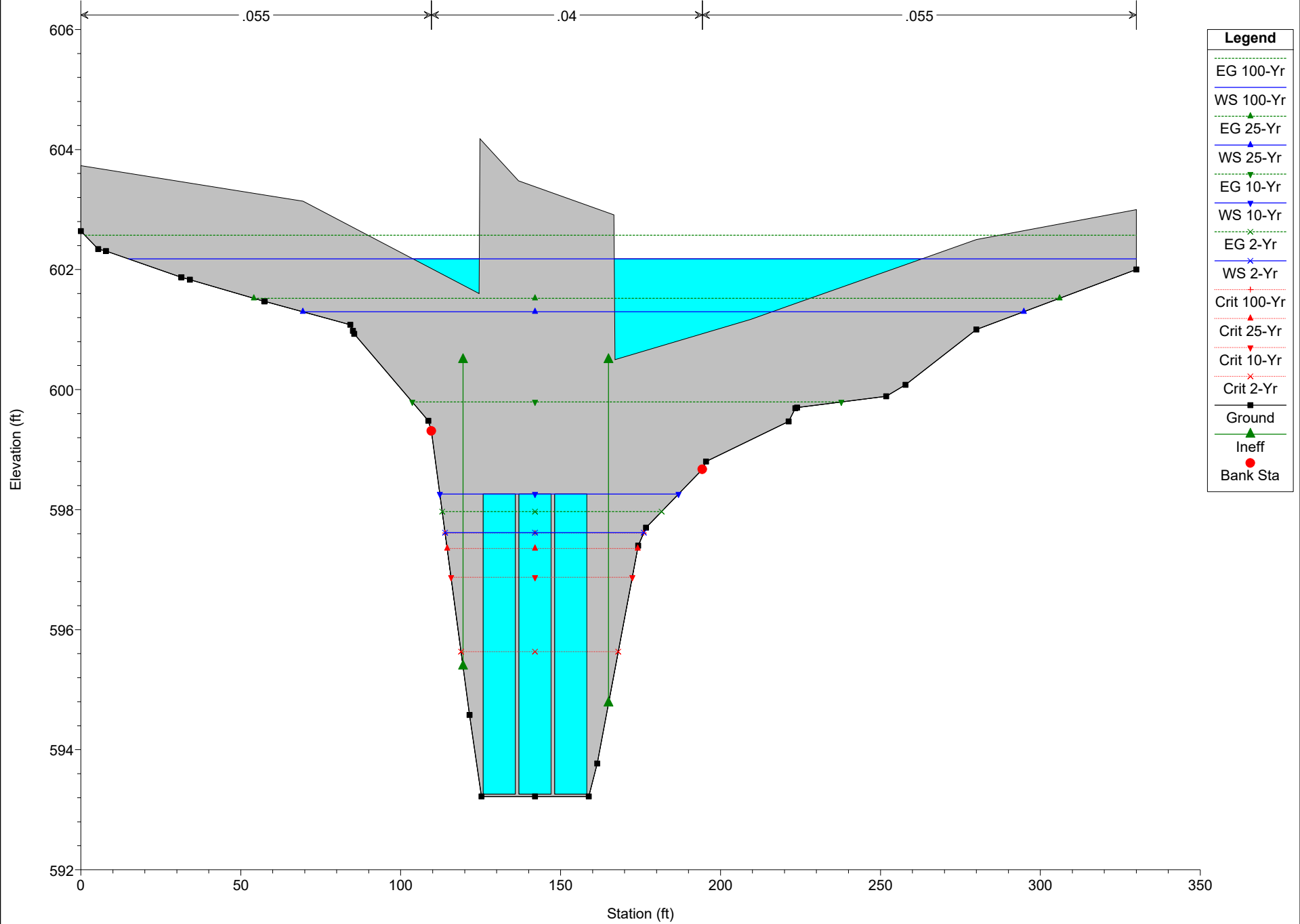


**Legend**

- EG 100-Yr
- WS 100-Yr
- EG 25-Yr
- WS 25-Yr
- EG 10-Yr
- WS 10-Yr
- Crit 100-Yr
- EG 2-Yr
- Crit 25-Yr
- WS 2-Yr
- Crit 10-Yr
- Crit 2-Yr
- Ground
- Ineff
- Bank Sta

Reid Br Trib 1-Pr Lynn Plan: PrBox-1 11/18/2021

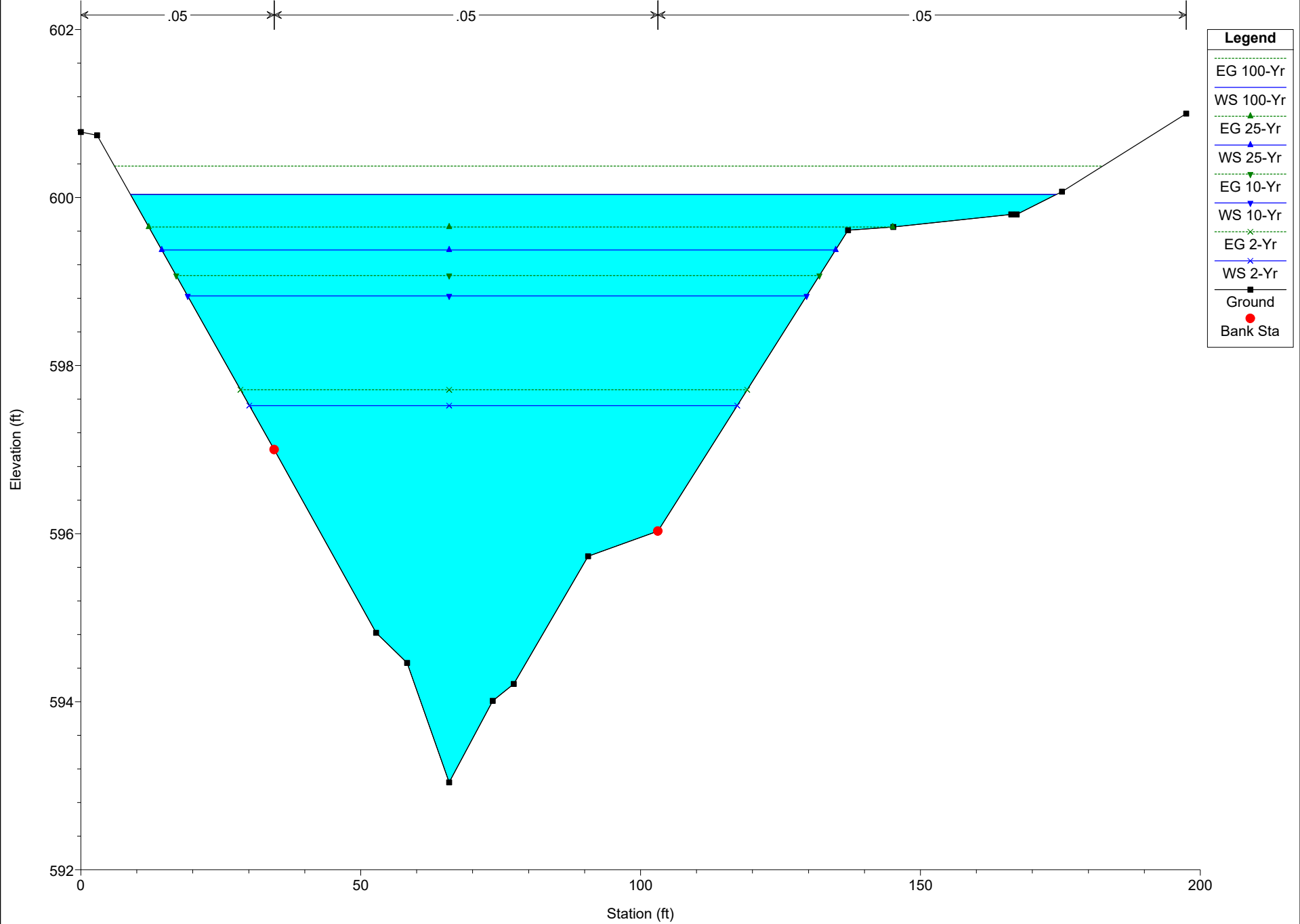
RS = 533.93 Culv Lynn Lane Crossing Existing





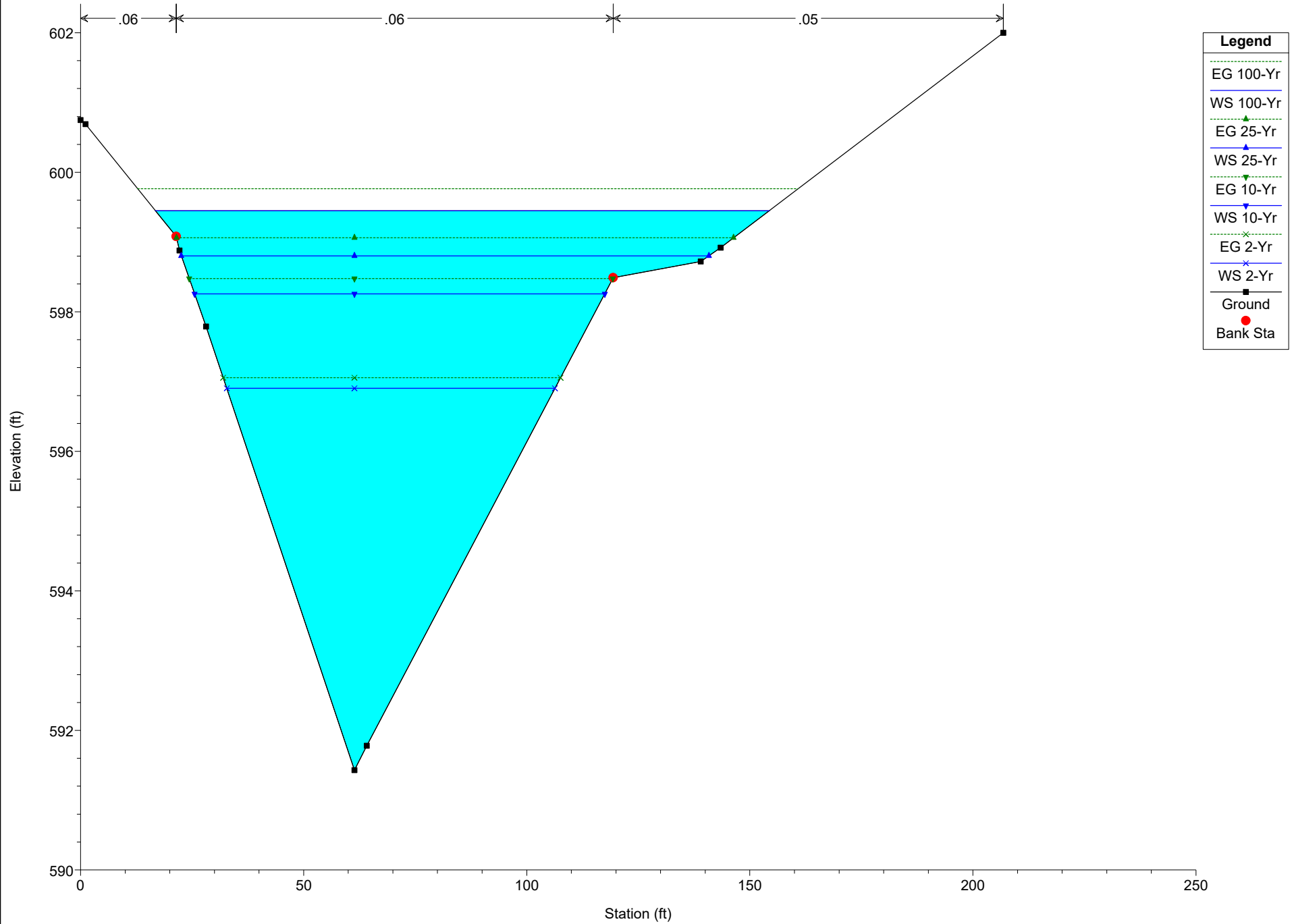
Reid Br Trib 1-Pr Lynn Plan: PrBox-1 11/18/2021

RS = 485.57



Reid Br Trib 1-Pr Lynn Plan: PrBox-1 11/18/2021

RS = 331.24

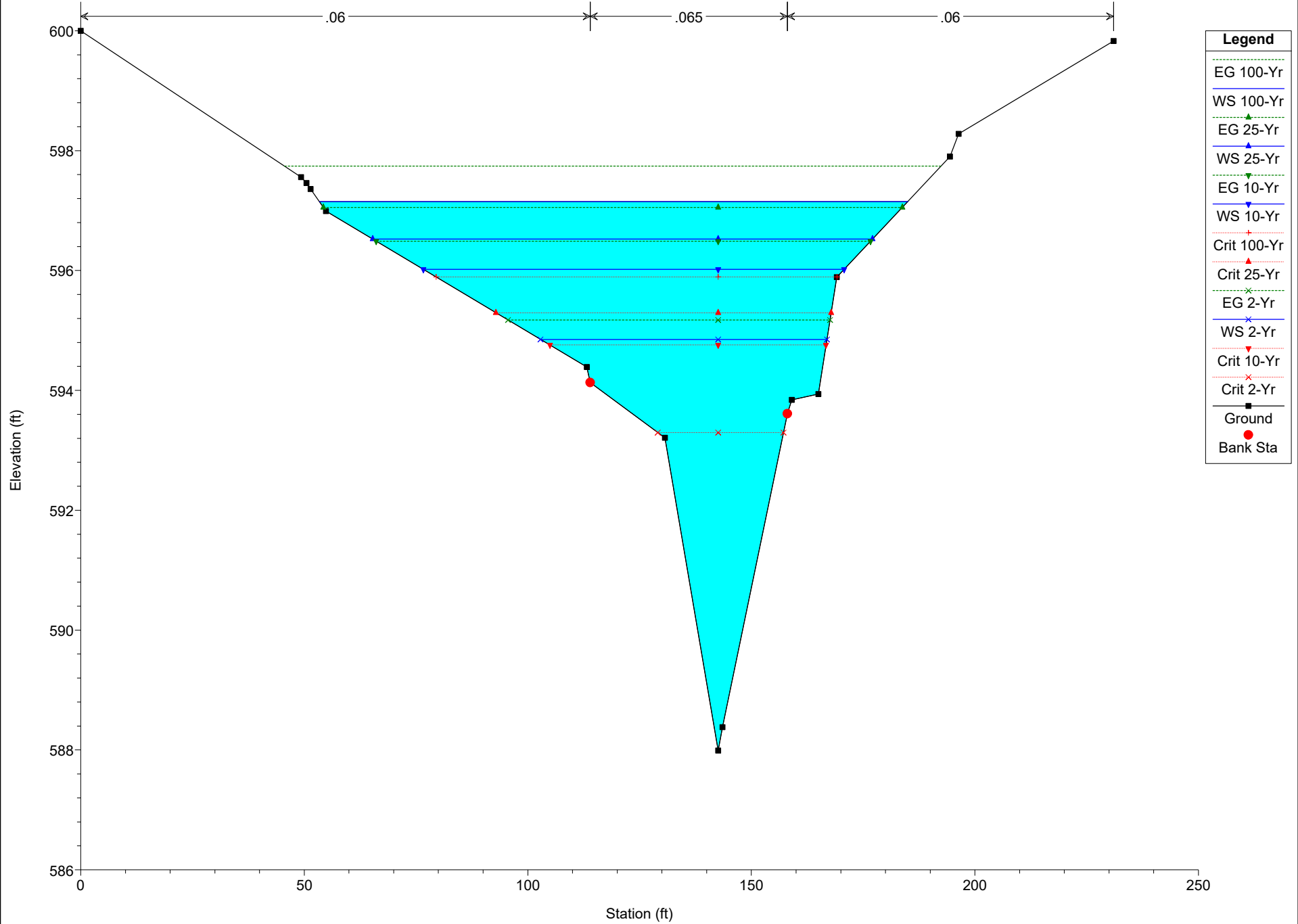


**Legend**

- EG 100-Yr
- WS 100-Yr
- EG 25-Yr
- WS 25-Yr
- EG 10-Yr
- WS 10-Yr
- EG 2-Yr
- WS 2-Yr
- Ground
- Bank Sta

Reid Br Trib 1-Pr Lynn Plan: PrBox-1 11/18/2021

RS = 31.74



City of Lucas

Lynn Lane Crossing Reid Branch Tributary 1

Existing Conditions

**EXHIBIT C-8**  
**STANDARD TABLE 1 COMPARISON**

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #
												Chl
Reid Branch Trib	843.95	100-Yr	1951.50	595.49	603.14		603.21	0.000657	2.64	1054.74	396.86	0.20
Reid Branch Trib	843.95	25-Yr	1478.30	595.49	602.39		602.46	0.000835	2.70	768.75	354.75	0.22
Reid Branch Trib	843.95	10-Yr	1168.60	595.49	601.56		601.66	0.001275	2.95	529.82	243.28	0.26
Reid Branch Trib	843.95	2-Yr	622.00	595.49	599.11	599.11	599.81	0.01901	6.79	98.13	83.03	0.88
Reid Branch Trib	656.48	100-Yr	1951.50	593.72	603.06		603.14	0.000386	2.78	972.00	238.21	0.18
Reid Branch Trib	656.48	25-Yr	1478.30	593.72	602.31		602.38	0.000359	2.51	803.74	215.33	0.17
Reid Branch Trib	656.48	10-Yr	1168.60	593.72	601.48		601.55	0.000409	2.45	635.16	189.18	0.18
Reid Branch Trib	656.48	2-Yr	622.00	593.72	598.43		598.61	0.002317	3.62	199.36	107.61	0.37
Reid Branch Trib	566.51	100-Yr	1951.50	593.79	603.03	598.10	603.11	0.000336	2.42	1045.21	328.73	0.16
Reid Branch Trib	566.51	25-Yr	1478.30	593.79	602.28	597.48	602.35	0.000318	2.18	824.25	268.60	0.15
Reid Branch Trib	566.51	10-Yr	1168.60	593.79	601.45	597.03	601.51	0.000362	2.12	624.12	213.33	0.16
Reid Branch Trib	566.51	2-Yr	622.00	593.79	598.28	596.13	598.45	0.001319	3.29	189.34	81.64	0.30
Reid Branch Trib	533.93	Culvert										100-Year Depth Over Top Road 600.50
Reid Branch Trib	518.66	100-Yr	1951.50	593.22	599.95	597.45	600.66	0.002825	6.74	289.51	152.61	0.47
Reid Branch Trib	518.66	25-Yr	1478.30	593.22	599.35	596.79	599.85	0.002254	5.64	262.25	107.38	0.41
Reid Branch Trib	518.66	10-Yr	1168.60	593.22	598.85	596.33	599.22	0.001915	4.89	239.17	86.43	0.38
Reid Branch Trib	518.66	2-Yr	622.00	593.22	597.61	595.38	597.79	0.00133	3.40	182.77	62.05	0.30
Reid Branch Trib	485.57	100-Yr	1951.50	593.04	600.04		600.37	0.003236	4.94	469.40	165.38	0.39
Reid Branch Trib	485.57	25-Yr	1478.30	593.04	599.38		599.65	0.00308	4.38	376.04	120.39	0.37
Reid Branch Trib	485.57	10-Yr	1168.60	593.04	598.83		599.07	0.003195	4.08	312.89	110.58	0.37
Reid Branch Trib	485.57	2-Yr	622.00	593.04	597.52		597.71	0.004125	3.51	183.90	87.17	0.39
Reid Branch Trib	331.24	100-Yr	1975.00	591.43	599.45		599.76	0.004766	4.53	451.20	137.61	0.38
Reid Branch Trib	331.24	25-Yr	1493.00	591.43	598.80		599.06	0.004716	4.09	368.68	118.24	0.37
Reid Branch Trib	331.24	10-Yr	1180.00	591.43	598.26		598.48	0.004594	3.77	312.98	91.92	0.36
Reid Branch Trib	331.24	2-Yr	629.00	591.43	596.90		597.06	0.004245	3.13	201.00	73.57	0.33
Reid Branch Trib	31.74	100-Yr	1995.10	587.99	597.15	595.89	597.74	0.010011	6.75	363.58	131.59	0.52
Reid Branch Trib	31.74	25-Yr	1508.10	587.99	596.52	595.30	597.05	0.010016	6.21	287.12	111.81	0.51
Reid Branch Trib	31.74	10-Yr	1192.00	587.99	596.02	594.76	596.49	0.010007	5.75	235.03	94.08	0.50
Reid Branch Trib	31.74	2-Yr	634.2	587.99	594.85	593.30	595.17	0.01	4.62	143.41	64.06	0.47

City of Lucas

Lynn Lane Crossing Reid Branch Tributary 1

Proposed (3) 10' x 5' Boxes

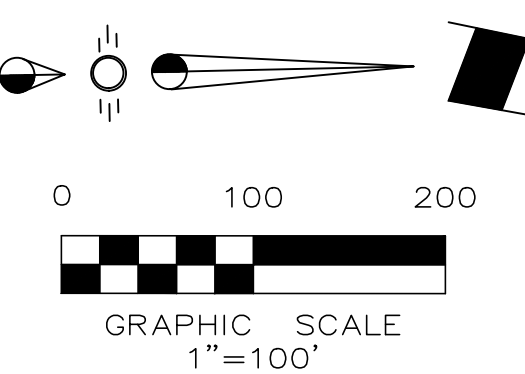
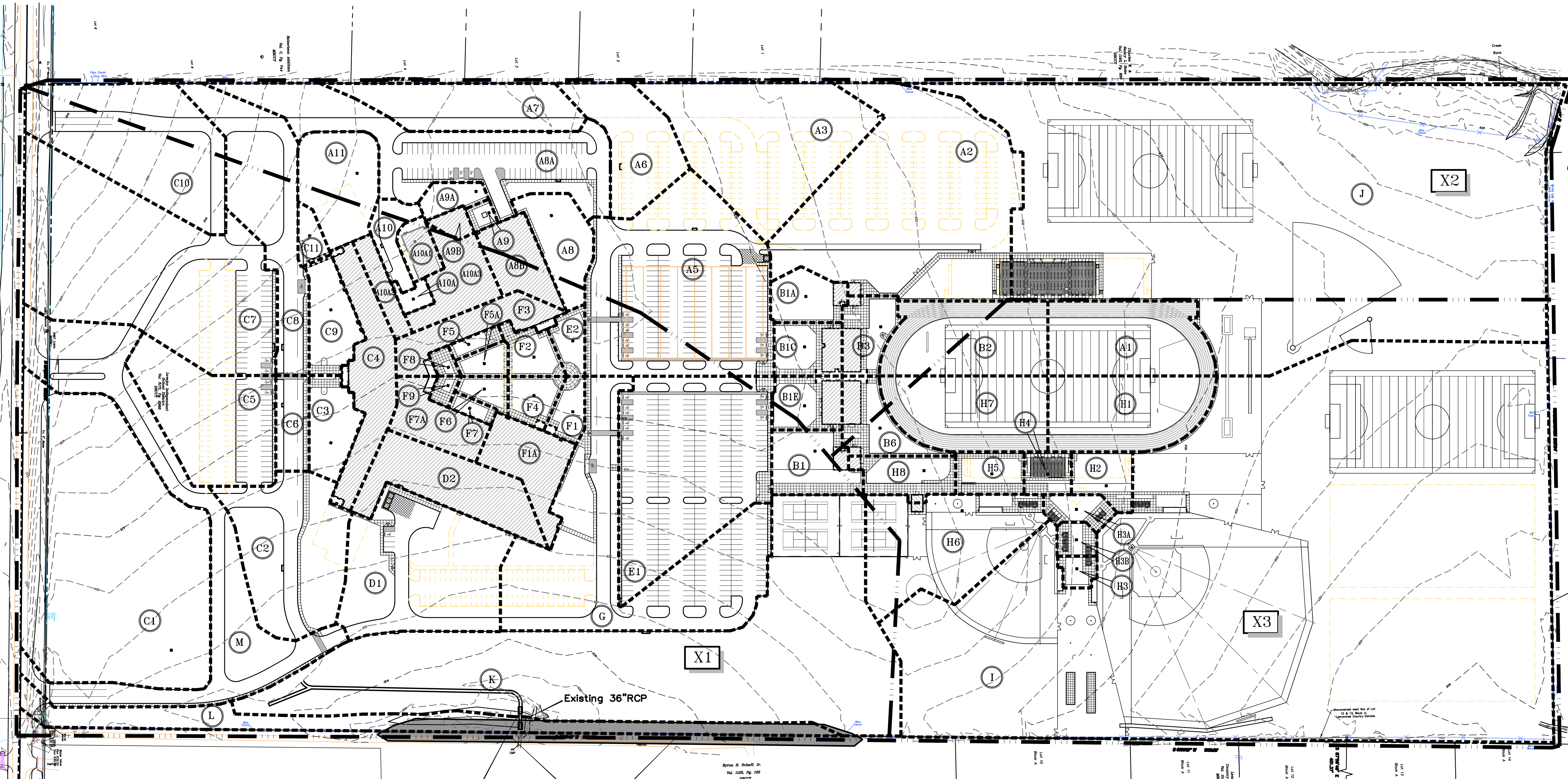
**EXHIBIT C-8**  
**STANDARD TABLE 1 COMPARISON**

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Prop - Existing (ft)	
												Chl		
Reid Branch Trib	843.95	100-Yr	1951.50	595.49	602.62		602.73	0.00113	3.25	853.89	368.71	0.25	-0.52	
Reid Branch Trib	843.95	25-Yr	1478.30	595.49	601.61		601.76	0.001928	3.66	541.98	248.07	0.32	-0.78	
Reid Branch Trib	843.95	10-Yr	1168.60	595.49	600.51		600.81	0.005314	4.93	306.05	188.40	0.50	-1.05	
Reid Branch Trib	843.95	2-Yr	622.00	595.49	599.11	599.11	599.81	0.01901	6.79	98.13	83.03	0.88	0.00	
Reid Branch Trib	656.48	100-Yr	1951.50	593.72	602.51		602.62	0.00055	3.16	845.65	221.25	0.21	-0.55	
Reid Branch Trib	656.48	25-Yr	1478.30	593.72	601.48		601.59	0.000654	3.10	634.96	189.12	0.22	-0.83	
Reid Branch Trib	656.48	10-Yr	1168.60	593.72	600.31		600.44	0.001006	3.32	441.43	149.71	0.27	-1.17	
Reid Branch Trib	656.48	2-Yr	622.00	593.72	598.18		598.42	0.00331	4.08	173.38	100.09	0.44	-0.25	
Reid Branch Trib	566.51	100-Yr	1951.50	593.79	602.47	597.76	602.57	0.000453	2.70	891.04	282.35	0.19	-0.56	
Reid Branch Trib	566.51	25-Yr	1478.30	593.79	601.43	597.14	601.53	0.000531	2.61	637.82	212.45	0.20	-0.85	
Reid Branch Trib	566.51	10-Yr	1168.60	593.79	600.10	596.69	600.34	0.001061	3.95	295.52	111.10	0.28	-1.35	
Reid Branch Trib	566.51	2-Yr	622.00	593.79	598.07	595.77	598.22	0.001191	3.18	195.50	78.40	0.28	-0.21	
Reid Branch Trib	533.93		Culvert										Top Road 600.50	Road 1.97
Reid Branch Trib	518.66	100-Yr	1951.50	593.22	599.96	597.31	600.64	0.002632	6.59	296.24	153.19	0.46	0.01	
Reid Branch Trib	518.66	25-Yr	1478.30	593.22	599.36	596.65	599.83	0.002088	5.50	268.80	107.75	0.40	0.01	
Reid Branch Trib	518.66	10-Yr	1168.60	593.22	598.85	596.19	599.20	0.001763	4.76	245.61	86.67	0.36	0.00	
Reid Branch Trib	518.66	2-Yr	622.00	593.22	597.62	595.25	597.78	0.001187	3.28	189.44	62.17	0.28	0.01	
Reid Branch Trib	485.57	100-Yr	1951.50	593.04	600.04		600.37	0.003236	4.94	469.40	165.38	0.39	0.00	
Reid Branch Trib	485.57	25-Yr	1478.30	593.04	599.38		599.65	0.00308	4.38	376.04	120.39	0.37	0.00	
Reid Branch Trib	485.57	10-Yr	1168.60	593.04	598.83		599.07	0.003195	4.08	312.89	110.58	0.37	0.00	
Reid Branch Trib	485.57	2-Yr	622.00	593.04	597.52		597.71	0.004125	3.51	183.90	87.17	0.39	0.00	
Reid Branch Trib	331.24	100-Yr	1975.00	591.43	599.45		599.76	0.004766	4.53	451.20	137.61	0.38	0.00	
Reid Branch Trib	331.24	25-Yr	1493.00	591.43	598.80		599.06	0.004716	4.09	368.68	118.24	0.37	0.00	
Reid Branch Trib	331.24	10-Yr	1180.00	591.43	598.26		598.48	0.004594	3.77	312.98	91.92	0.36	0.00	
Reid Branch Trib	331.24	2-Yr	629.00	591.43	596.90		597.06	0.004245	3.13	201.00	73.57	0.33	0.00	
Reid Branch Trib	31.74	100-Yr	1995.10	587.99	597.15	595.89	597.74	0.010011	6.75	363.58	131.59	0.52	0.00	
Reid Branch Trib	31.74	25-Yr	1508.10	587.99	596.52	595.30	597.05	0.010016	6.21	287.12	111.81	0.51	0.00	
Reid Branch Trib	31.74	10-Yr	1192.00	587.99	596.02	594.76	596.49	0.010007	5.75	235.03	94.08	0.50	0.00	
Reid Branch Trib	31.74	2-Yr	634.20	587.99	594.85	593.30	595.17	0.01	4.62	143.41	64.06	0.47	0.00	

DRAINAGE AREA CALCULATIONS

DRAINAGE AREA No.	DRAINAGE AREA (Acres)	C	t <sub>c</sub> (min)	I <sub>100</sub> (in/hr)	Q <sub>100</sub> (cfs)
A1	0.83	0.7	10	8.74	5.1
A2	2.74	0.9	10	8.74	21.6
A3	1.56	0.9	10	8.74	12.3
A5	2.21	0.9	10	8.74	17.4
A6	0.63	0.9	10	8.74	5.0
A7	0.70	0.7	10	8.74	4.3
A8	0.38	0.7	10	8.74	2.3
A8A	1.48	0.9	10	8.74	11.6
A8B	0.31	1.0	10	8.74	2.7
A9	0.05	0.7	10	8.74	0.3
A9A	0.12	0.7	10	8.74	0.7
A9B	0.07	1.0	10	8.74	0.6
A10	0.18	0.9	10	8.74	1.4
A10A1	0.13	0.7	10	8.74	0.8
A10A2	0.15	1.0	10	8.74	1.3
A10A3	0.35	1.0	10	8.74	3.1
A10A	3.34	0.7	10	8.74	27.4
A11	0.54	0.7	10	8.74	3.3
B1	0.37	0.7	10	8.74	2.3
B1A	0.25	0.7	10	8.74	1.5
B1C	0.26	0.7	10	8.74	1.6
B1E	0.26	0.7	10	8.74	1.6
B2	0.83	0.7	10	8.74	5.1
B3	0.27	0.7	10	8.74	1.7
B6	0.32	0.7	10	8.74	2.0
C1	3.34	0.9	10	8.74	27.4
C2	1.09	0.7	10	8.74	6.7
C3	0.31	0.7	10	8.74	1.9
C4	0.59	1.0	10	8.74	5.2
C5	1.02	0.9	10	8.74	8.3
C6	0.22	0.9	10	8.74	1.7
C7	2.60	0.7	10	8.74	15.9
C8	1.04	0.9	10	8.74	8.2
C9	0.33	0.7	10	8.74	2.0
C10	1.35	0.7	10	8.74	8.3
C11	0.09	0.7	10	8.74	0.6
D1	1.40	0.7	10	8.74	8.6
D2	0.68	1.0	10	8.74	5.9
E1	1.85	0.9	10	8.74	14.6
E2	0.13	0.7	10	8.74	0.8
F1	0.13	0.7	10	8.74	0.8
F1A	0.41	1.0	10	8.74	3.6
F2	0.17	0.7	10	8.74	1.0
F3	0.37	1.0	10	8.74	3.2
F4	0.16	0.7	10	8.74	1.0
F5	0.06	0.7	10	8.74	0.4
F5A	0.10	0.7	10	8.74	0.6
F6	0.10	0.7	10	8.74	0.6
F7	0.05	0.7	10	8.74	0.3
F7A	0.33	1.0	10	8.74	2.9
F8	0.04	0.9	10	8.74	0.3
F9	0.04	0.9	10	8.74	0.3
G	2.12	0.9	10	8.74	16.7
H1	0.81	0.7	10	8.74	5.0
H2	0.21	0.7	10	8.74	1.3
H3	0.08	0.7	10	8.74	0.5
H3A	0.14	0.7	10	8.74	0.9
H3B	0.09	0.7	10	8.74	0.6
H4	0.14	0.7	10	8.74	0.9
H5	0.21	0.7	10	8.74	1.3
H6	1.13	0.7	10	8.74	6.3
H7	0.81	0.7	10	8.74	5.0
H8	0.27	0.7	10	8.74	1.7
I	15.94	0.7	10	8.74	85.3
J	9.64	0.9	10	8.74	59.0
K	4.77	0.7	10	8.74	29.2
L	0.90	0.7	10	8.74	5.5
M	2.10	0.9	10	8.74	16.5
X1	4.6	0.35	40	4.90	50.9
X2	20.8	0.35	40	4.90	35.5
X3	19.8	0.35	40	4.90	34.0

F.M.H.I.C.H.A.Y.N. 2170



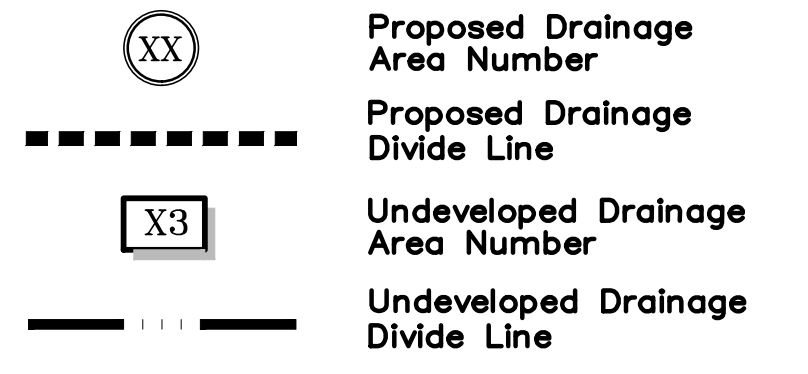
**REMOVE EXISTING SLOPED-END HEADWALL, CONNECT TO EXISTING 36\"/>**

**PLACE NATIVE FILL MATERIAL ALONG EXISTING DETENTION BASIN BERM IN ORDER TO RAISE TOP OF BERM TO A MINIMUM ELEVATION 631.2. SIDE SLOPES OF FILL AREA SHALL NOT EXCEED 4:1 (HORIZONTAL:VERTICAL). FILL AND DISTURBED AREAS SHALL BE EITHER SOLID SODDED OR SEEDED WITH COMMON BURMUDA AND IRRIGATED UNTIL ESTABLISHED.**

**GENERAL NOTES**

- All materials and construction shall conform to the City of Lucas Standard Construction Details and Specifications except as noted herein or approved by the City.
- All storm sewer pipe 15" and larger shall be Class III RCP.
- Contractor shall be responsible for maintaining trench safety requirements in accordance with City Standards, Texas State Law, and O.S.H.A. Standards for all excavation in excess of five feet in depth.
- Concrete for inlets and drainage structures shall be 4200 psi at 28 days.
- Contractor shall protect all utilities in the construction of this project.
- All trench backfill for storm sewer shall be compacted as required by City.
- All private storm sewer shall be inspected by City of Lucas Engineering Department.

**DRAINAGE LEGEND**



**MODIFIED RATIONAL METHOD DETENTION BASIN DESIGN**  
PROJECT: LOVEJOY HIGH SCHOOL - 100 YR

August 23, 2021

Rainfall Coefficient C = 0.7  
Drainage Area - A = 31.04 acres  
Time of Concentration - t<sub>c</sub> = 10 minutes  
Maximum Outflow Rate - Q<sub>2</sub> = 51.4 cfs

Duration (minutes)	Intensity (inches/hr)	Depth (inches)	Inflow Discharge (cfs)	Inflow Volume (Cu.Ft.)	Outflow Duration (minutes)	Outflow Volume (Cu.Ft.)	Storage Volume (Cu.Ft.)
5	10.20	0.85	221.6	66.84	15	23.10	43,364
10	8.34	1.66	190.0	113.76	20	30.60	43,156
15	7.69	1.92	167.1	150.30	25	38.50	111,800
20	6.89	2.30	149.6	179.56	30	46.20	133,306
30	5.74	2.87	124.1	245.42	40	61.60	162,863
40	4.96	3.30	107.7	238.43	50	77.10	181,335
45	4.38	3.65	98.2	285.19	60	92.50	192,989
60	3.94	3.94	85.6	308.07	70	107.60	200,097
70	3.59	4.18	77.9	327.30	80	123.60	203,962
80	3.30	4.40	71.2	343.40	90	138.70	205,800
90	3.06	4.59	66.5	359.10	100	154.20	204,001
100	2.83	5.04	59.9	396.60	100	200,660	195,636
180	1.92	5.75	41.6	449.42	100	292,800	156,472
300	1.16	6.97	25.3	545.70	170	570.60	124,970
720	0.69	8.32	15.1	651.33	730	1,125.60	49,627
1440	0.41	9.85	8.9	770.26	1450	2,235.00	1,465,674

Required Storage Volume = 205,360 cubic feet  
4.71 acre-feet

**MODIFIED RATIONAL METHOD DETENTION BASIN DESIGN**  
PROJECT: LOVEJOY HIGH SCHOOL - 25 YR

August 23, 2021

Rainfall Coefficient C = 0.7  
Drainage Area - A = 31.04 acres  
Time of Concentration - t<sub>c</sub> = 10 minutes  
Maximum Outflow Rate - Q<sub>2</sub> = 41.9 cfs

Duration (minutes)	Intensity (inches/hr)	Depth (inches)	Inflow Discharge (cfs)	Inflow Volume (Cu.Ft.)	Outflow Duration (minutes)	Outflow Volume (Cu.Ft.)	Storage Volume (Cu.Ft.)
5	8.50	0.71	184.7	55.07	15	18.87	36,574
10	7.26	1.21	157.1	94.67	20	25.10	69,697
15	6.36	1.59	138.2	124.46	25	31.38	92,958
20	5.68	1.89	123.1	148.07	30	37.60	110,342
30	4.70	2.35	102.2	183.90	40	50.20	132,743
40	4.04	2.69	87.8	210.27	50	62.70	147,852
45	3.59	2.96	77.2	231.06	60	75.30	156,306
60	3.18	3.18	66.1	248.89	70	87.80	161,004
70	2.89	3.37	62.7	263.99	80	100.40	163,090
80	2.61	3.53	57.5	276.37	90	112.90	163,132
90	2.41	3.67	53.2	287.28	100	125.50	161,708
100	2.24	3.81	49.2	296.95	100	137.90	158,936
180	1.50	4.51	32.6	352.59	190	238.54	114,014

Required Storage Volume = 163,132 cubic feet  
3.76 acre-feet

**MODIFIED RATIONAL METHOD DETENTION BASIN DESIGN**  
PROJECT: LOVEJOY HIGH SCHOOL - 5 YR

August 23, 2021

Rainfall Coefficient C = 0.7  
Drainage Area - A = 31.04 acres  
Time of Concentration - t<sub>c</sub> = 10 minutes  
Maximum Outflow Rate - Q<sub>2</sub> = 31.8 cfs

Duration (minutes)	Intensity (inches/hr)	Depth (inches)	Inflow Discharge (cfs)	Inflow Volume (Cu.Ft.)	Outflow Duration (minutes)	Outflow Volume (Cu.Ft.)	Storage Volume (Cu.Ft.)
5	6.95	0.58	151.0	45.28	15	14.31	30,974
10	5.81	0.97	126.2	75.21	20	19.86	60,666
15	5.02	1.29	109.0	98.08	25	23.88	74,228
20	4.43	1.48	96.2	115.47	30	28.09	86,643
30	3.61	1.81	78.5	141.32	40	38.72	101,160
40	3.07	2.05	66.7	160.89	50	47.75	112,274
45	2.68	2.23	58.2	174.60	60	57.28	117,433
60	2.35	2.31	51.8	186.57	70	66.80	119,773
70	2.12	2.51	46.8	196.50	80	76.34	120,219
80	1.97	2.62	42.7	205.64	90	85.87	119,271
90	1.81	2.72	39.4	212.10	100	95.40	117,280
100	1.68	2.90	32.1	220.95	100	124.09	106,036
180	1.09	3.28	23.8	256.33	190	181.37	75,214

Required Storage Volume = 120,219 cubic feet  
2.76 acre-feet

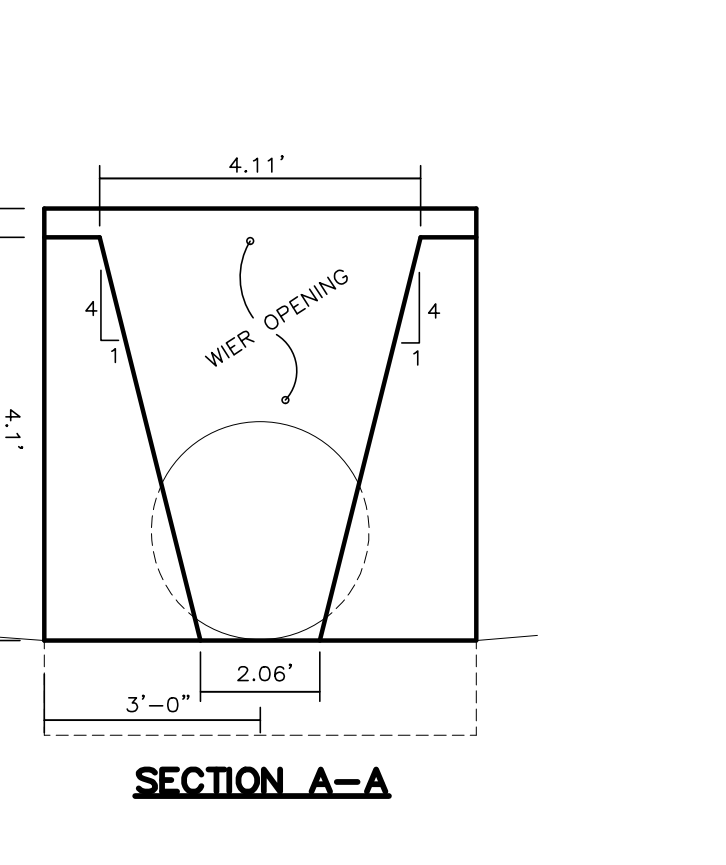
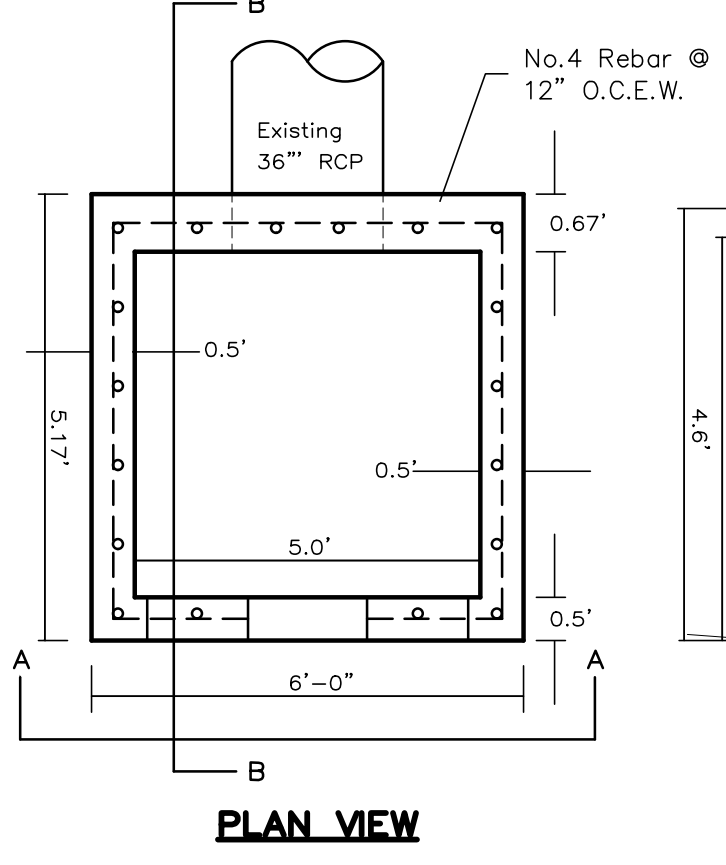
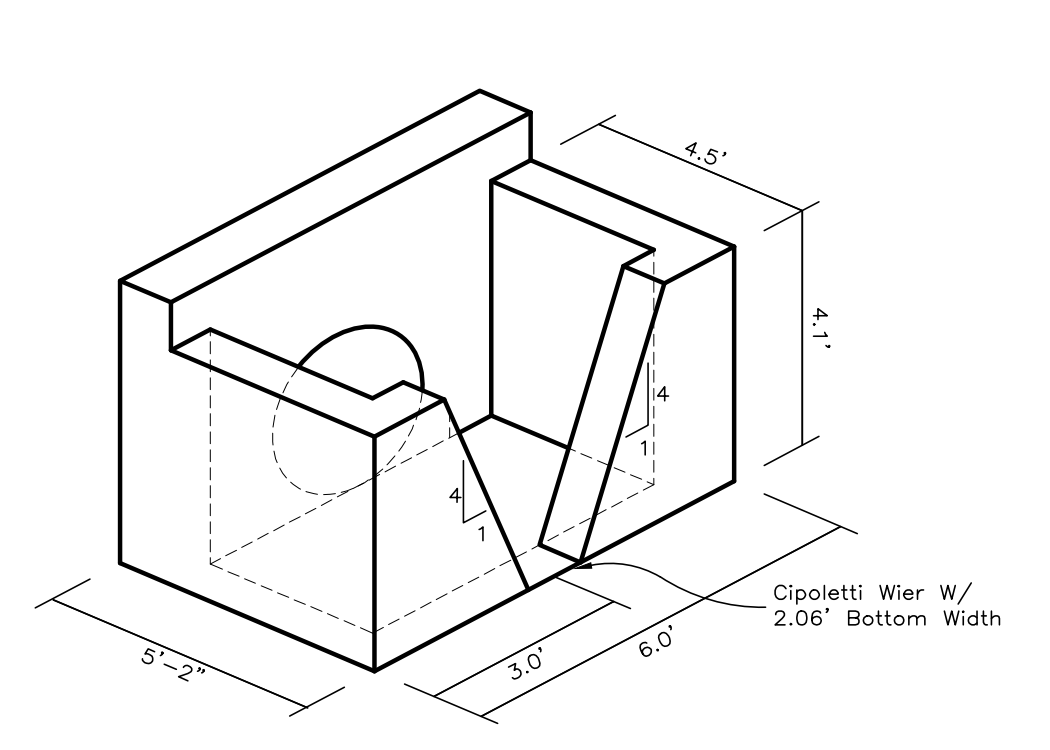
**MODIFIED RATIONAL METHOD DETENTION BASIN DESIGN**  
PROJECT: LOVEJOY HIGH SCHOOL - 2 YR

August 23, 2021

Rainfall Coefficient C = 0.7  
Drainage Area - A = 31.04 acres  
Time of Concentration - t<sub>c</sub> = 10 minutes  
Maximum Outflow Rate - Q<sub>2</sub> = 26.1 cfs

Duration (minutes)	Intensity (inches/hr)	Depth (inches)	Inflow Discharge (cfs)	Inflow Volume (Cu.Ft.)	Outflow Duration (minutes)	Outflow Volume (Cu.Ft.)	Storage Volume (Cu.Ft.)
5	5.91	0.49	128.4	38.23	15	11.70	26,770
10	4.99	0.82	106.6	63.89	20	15.66	49,292
15	4.21	1.05	91.5	82.33	25	19.83	62,735
20	3.70	1.23	80.3	96.75	30	23.99	72,870
30	2.99	1.49	64.9	116.81	40	31.32	82,509
40	2.52	1.68	54.7	131.34	50	39.16	92,170
45	2.18	1.82	47.5	142.82	60	46.99	95,364
60	1.91	1.91	42.0	151.10	70	54.81	96,363
70	1.74	2.03	37.7	158.42	80	62.64	95,818
80	1.58	2.11	34.3	164.66	90	70.49	94,108
90	1.45	2.17	31.5	170.07	100	78.30	91,687
100	1.32	2.34	25.4	182.70	100	101.82	80,877
180	0.85	2.55	18.5	199.71	190	148.82	50,844

Required Storage Volume = 96,363 cubic feet  
2.11 acre-feet



**100YR DETENTION CALCULATION SUMMARY**

**EXISTING CONDITIONS**      **UNDETAINED RELEASE RATE**  
Area = 29.6 Ac.      No Undetained Release  
C = 0.35  
T<sub>c</sub> = 40 min  
I<sub>100</sub> = 4.98 in/hr  
Q<sub>100</sub> = 51.4 cfs      **MAXIMUM TOTAL RELEASE RATE =**  
**EXISTING FLOW**  
Q<sub>100</sub> = 51.4 cfs

**PROPOSED CONDITIONS**  
Area = 31.04 Ac.  
C = 0.70  
T<sub>c</sub> = 10 min  
I<sub>100</sub> = 8.74 in/hr  
Q<sub>100</sub> = 189.9 cfs

**25YR DETENTION CALCULATION SUMMARY**

**EXISTING CONDITIONS**      **UNDETAINED RELEASE RATE**  
Area = 29.6 Ac.      No Undetained Release  
C = 0.35  
T<sub>c</sub> = 40 min  
I<sub>25</sub> = 4.04 in/hr  
Q<sub>25</sub> = 41.9 cfs      **MAXIMUM TOTAL RELEASE RATE =**  
**EXISTING FLOW**  
Q<sub>25</sub> = 41.9 cfs

**PROPOSED CONDITIONS**  
Area = 31.04 Ac.  
C = 0.70  
T<sub>c</sub> = 10 min  
I<sub>25</sub> = 7.28 in/hr  
Q<sub>25</sub> = 157.7 cfs

**5YR DETENTION CALCULATION SUMMARY**

**EXISTING CONDITIONS**      **UNDETAINED RELEASE RATE**  
Area = 29.6 Ac.      No Undetained Release  
C = 0.35  
T<sub>c</sub> = 40 min  
I<sub>5</sub> = 3.07 in/hr  
Q<sub>5</sub> = 31.8 cfs      **MAXIMUM TOTAL RELEASE RATE =**  
**EXISTING FLOW**  
Q<sub>5</sub> = 31.8 cfs

**PROPOSED CONDITIONS**  
Area = 31.04 Ac.  
C = 0.70  
T<sub>c</sub> = 10 min  
I<sub>5</sub> = 5.81 in/hr  
Q<sub>5</sub> = 126.2 cfs

**2YR DETENTION CALCULATION SUMMARY**

**EXISTING CONDITIONS**      **UNDETAINED RELEASE RATE**  
Area = 29.6 Ac.      No Undetained Release  
C = 0.35  
T<sub>c</sub> = 40 min  
I<sub>2</sub> = 2.52 in/hr  
Q<sub>2</sub> = 26.1 cfs      **MAXIMUM TOTAL RELEASE RATE =**  
**EXISTING FLOW**  
Q<sub>2</sub> = 26.1 cfs

**PROPOSED CONDITIONS**  
Area = 31.04 Ac.  
C = 0.70  
T<sub>c</sub> = 10 min  
I<sub>2</sub> = 4.31 in/hr  
Q<sub>2</sub> = 108.7 cfs

**ISOMETRIC METRIC VIEW**

**PLAN VIEW**

**SECTION A-A**

**Note: Concrete Drainage Structures Shall Have A Compressive Strength Of 4200psi. Refer To Manufacturer For Steel Reinforcement.**

**Worksheet for Cipolletti Weir - 25Yr**

Project Description	Headwater Elevation
Area For	Headwater Elevation
Height	31.00 ft
Outlet Elevation	628.00 ft
Outlet Discharge	107.00 cfs
Flow Coefficient	3.97 US
Flow Length	2.00 ft
Headwater Elevation	628.00 ft
Headwater Height Above Crest	

## **ARTICLE 10.04 STORMWATER RUNOFF REGULATIONS AND CONTROL**

### **Sec. 10.04.001 Purpose**

The purpose of this article is to diminish threats to the public health and safety caused by the runoff of excess stormwater, to minimize movement of soils resulting from development, to reduce the possibilities of hydraulic overloading of the storm sewer drainage system, to reduce economic losses to individuals and the community at large as a result of erosion and the runoff of excess stormwater, and to protect and conserve land and water resources, while at the same time ensuring orderly development. The provisions of this article are specifically intended to supplement existing ordinances regulating the following:

- (1) The subdivision, layout, and improvement of lands located within the city;
- (2) The excavating, filling, and grading of lots and other parcels or areas;
- (3) The construction of buildings, including related parking and other paved areas, and the drainage of the sites on which those structures and their related parking and other paved areas are located; and
- (4) The design, construction, and maintenance of erosion control and stormwater drainage facilities and systems.

### **Sec. 10.04.002 Definitions**

For the purposes of this article, the following definitions are adopted:

*Base flood elevation.* The elevation delineating the flood level having a one-percent probability of being equaled or exceeded in any given year (also known as the 100-year flood elevation), as determined from flood insurance rate maps (FIRMS) or the best available information.

*Channel.* A natural or manmade open watercourse with definite bed and banks which periodically or continuously contains moving water, or which forms a connecting link between two bodies of water.

*City.* The City of Lucas.

(Ordinance 2009-04-00645 adopted 4/2/09)

City engineer. The city engineer or designee.

City manager. The city manager or designee.

(Ordinance 2021-11-00939 adopted 11/4/21)

Conduit. Any channel, pipe, sewer, or culvert used for the conveyance of movement of water, whether open or closed.

Control elevation. Contour lines and points of predetermined elevation used to denote a detention storage area on a plat or site drawing.

Design standards for public improvements. Standards on file in the city's offices to which all designs and the resulting public improvements, must conform.

Detention facility. A facility constructed or modified to restrict the flow of stormwater to a prescribed maximum rate, and to concurrently detain the excess waters that accumulated behind the outlet.

Detention storage. The temporary detaining or storage of stormwater in storage basins, on rooftops, in streets, parking lots, school yards, parks, open space, or other areas under predetermined and controlled conditions, with the rate of drainage therefrom regulated by appropriately installed devices.

Discharge. The rate of outflow of water from any source.

Drainage area. The area from which water is carried off by a drainage system, i.e., a watershed or catchment area.

Excess stormwater runoff. The rate of flow of stormwater discharged from an urbanized drainage area which is or will be in excess of that volume and rate which represented or represents the runoff from the property prior to the date of this article.

Floodplain. The special flood hazard lands adjoining a watercourse, the surface elevation of which is lower than the base flood elevation and is subject to periodic inundation.

Hydrograph. A graph showing, for a given point on a stream or conduit, the runoff flow rate with respect to time.

Land disturbance. Any manmade change to improve or unimprove real estate including but not limited to building structures, filling, grading, excavation, clearing, or removal of vegetation.

(Ordinance 2009-04-00645 adopted 4/2/09)

Municipal separate storm sewer system {MS4}. A conveyance or system of conveyances including roads with drainage systems, municipal city streets, catchbasins, curbs, gutters, ditches, manmade channels or storm drains and similar means of collecting or conveying water runoff. (Ordinance 2020-06-00914 adopted 6/4/20)

One-hundred-year storm. A precipitation event of 24-hours' duration, having a one-percent chance of occurring in any one year.

Peak flow. The maximum rate of flow of stormwater at a given point or in a channel or conduit resulting from a predetermined storm or flood.

Sediment. Any particulate matter that can be transported by fluid flow, and which eventually is deposited.

Stormwater drainage facility. Any element in a stormwater drainage system which is made or improved by man.

Stormwater drainage system. All means, natural or manmade, used for conducting stormwater to, through, or from a drainage area to the point of final outlet including, but not limited to, any of the following: open and closed conduits and appurtenant features, canals, channels, ditches, streams, swales, culverts, streets, and pumping stations.

Stormwater runoff. The waters derived from precipitation within a tributary drainage area flowing over the surface of the ground or collected in channels or conduits.

Time of concentration. The elapsed time for stormwater to flow from the most distant point in a drainage area to the outlet or other predetermined point.

Two-year storm. A precipitation event having a fifty percent chance of occurring in any one year.

Two-year storm runoff. The stormwater runoff having a fifty percent probability of occurring in any one year.

Unprotected channel. A channel which receives stormwater discharge and which is not paved, riprapped, or otherwise improved by addition of manmade materials so as to reduce the potential for erosion.

*Upland area.* Any land whose surface drainage flows toward the area being considered for development.

*Urbanization.* The development, change, or improvement of any parcel of land consisting of one or more lots for residential, commercial, industrial, institutional, recreational, or public utility purposes.



*Waterbody.* Any natural or artificial pond, lake, reservoir, or other area which ordinarily or intermittently contains water and which has a discernable shoreline.

*Watercourse.* Any natural or artificial stream, river, creek, channel, ditch, canal, conduit, culvert, drain, waterway, gully, ravine, street, roadway, swale, or wash in which water flows in a definite direction, either continuously or intermittently, and which has a definite channel, bed, or banks.

*Wet bottom detention basin.* A basin designed to retain a permanent pool of stormwater after having provided its planned detention of runoff during a storm event.

  **Sec. 10.04.003 Permit**

Before initiating any activity regulated by this article, an applicant shall be required to obtain a permit from the city which indicated that the requirements of this article have been met. Permit fees shall be located in the city fee schedule for permits.

  **Sec. 10.04.004 Other requirements**

In addition to meeting the requirements of section [10.04.003](#) and the more specific requirements of sections [10.04.005–10.04.031](#) of this article and before starting any activity regulated by this article, an applicant shall comply with the requirements set forth in all other related ordinances and state statutes and regulations.



(Ordinance 2009-04-00645 adopted 4/2/09)

  **Sec. 10.04.005 Specific requirements; general**

Sediment shall be maintained on site and excess stormwater runoff shall be detained in connection with any new construction, development, redevelopment, or land use change occurring within the city in accordance with the requirements set forth in this article. (Ordinance 2020-05-00911 adopted 5/7/20)

  **Sec. 10.04.006 Discharge rate**

The peak discharge rate after full development resulting from the proposed development shall not exceed the corresponding peak discharge rate prior to development during storms of 2-year, 5-year, 10-year, 25-year and 100-year return frequencies. (Ordinance 2021-11-00939 adopted 11/4/21)

  **Sec. 10.04.007 Flood elevation**

There shall be no detrimental effect on the floodway or the flood elevation during a 100-year storm upstream or downstream of the proposed development area as a result of the proposed development.

  **Sec. 10.04.008 Allowable detention facilities**



The increased stormwater runoff resulting from proposed development shall be detained by providing for appropriate detention storage as required by this article. Where streets or parking areas are used for temporary storage of stormwater runoff all manholes for sanitary sewers shall be of a type which prevent the infiltration of the ponded water. Where streets are used for the temporary storage of stormwater runoff, in no case shall the maximum design depth exceed six (6) inches.

  **Sec. 10.04.009 Detention storage**



Designs for detention storage and related appurtenances shall be submitted to the city for approval. Upon submittal of designs of detention storage the city shall make a determination as to whether any or all of the facilities proposed are to become part of the public drainage system. The city shall, at the same time, in the case of a proposed subdivision make a determination as to those control elevations that shall be entered on the final plat or make a determination as to the necessity for deed restrictions on any particular lot in said subdivision requiring the preservation of mandatory drainage facilities. Where a non-subdivided parcel of land is proposed for development, the city shall make a determination as to the need for covenants to maintain responsibility for mandatory drainage facilities. All of said facilities shall be designed and constructed in accordance with the city specifications, and shall be subject to continuing inspection during the construction period in the same manner as any other improvement regulated under this article. Detention facilities associated with residential subdivisions shall be in a separate lot that shall be deeded to the HOA after 75% of the lots in the subdivision are occupied and the lot soil stabilized. Prior to acceptance of the detention facility the city and the developer will inspect the facility to assure it meets all of the requirements of this article. If any deficiencies are found, the developer will be responsible to make the necessary changes at his expense. Wet bottom detention basin shall be aerated or designed to drain within 60 hours.

  **Sec. 10.04.010 Sizing of detention storage and outlet**



Detention storage shall meet the requirements of this article and the city drainage manual.

  **Sec. 10.04.011 Discharge velocity**

The discharge velocity from detention facilities shall not exceed three feet per second unless it is determined by the city that greater velocities will not be harmful to the receiving channel. Where the city's determination is requested, the developer shall make available such hydraulic or hydrologic computations as will adequately support the course of action being requested.

  **Sec. 10.04.012 Emergency spillway**

Emergency spillways shall be provided to permit the safe passage of runoff generated from rainfall events in excess of the 100-year rainfall event.

  **Sec. 10.04.013 Freeboard**

Detention storage areas shall have adequate capacity to contain the storage volume of tributary stormwater runoff with at least one foot of freeboard above the water surface during the 100-year rainfall event.

  **Sec. 10.04.014 Joint development of control system**

Stormwater control systems may be planned in coordination by two or more property owners as long as the potential for damage from stormwater is not increased at intervening locations.



  **Sec. 10.04.015 Early installation of control systems**

Stormwater control measures shall be installed prior to undertaking other grading of site and a schedule of construction for this purpose shall be submitted by the owner(s)/developer(s) prior to construction in the city.



  **Sec. 10.04.016 Flows from upland areas**

The total drainage area must be used in calculating the allowable release rate. The required storage volume will be based on the project area only, with extraneous flows from upland areas being bypassed or discharged via overflow spillways or other devices. Where storm sewers are required they shall be of such size as will provide



sufficient capacity to receive the flow generated by five-year storm from upland areas. As to the latter and regardless of whether it has occurred in fact, such upland area shall be deemed to have been fully developed for all purposes of this requirement.

  **Sec. 10.04.017 Land disturbance of five acres or more**

The developer shall comply with the Texas Commission on Environmental Quality or TPDES and federal NPDES permit for stormwater discharges associated with construction activity and provide a copy to the city prior to starting construction.



  **Sec. 10.04.018 Land disturbance of more than two acres and less than five acres**

The developer shall submit to the city a sediment and erosion control plan that meets the requirements of the Texas Commission on Environmental Quality or TPDES and federal NPDES permit for stormwater discharges associated with construction activity prior to starting construction.

  **Sec. 10.04.019 All land disturbances**

Land disturbances associated with any new construction, development, redevelopment, or land use change on any site of 2,500 square foot or larger or requiring a building permit shall incorporate into the development plan the following elements as minimum:

- (1) Stone construction entrance.
- (2) Silt fence or other sediment retaining device on the low side of the site.
- (3) Temporary seeding of disturbed areas remaining open more than three weeks.
- (4) Immediate removal of soil tracked into the public right-of-way.
- (5) Permanent turf established. A copy of the development plan shall be submitted to the city prior to starting construction.

  **Sec. 10.04.020 Preliminary plats**



Information indicating the manner in which the provisions of this article are to be met shall be submitted with the preliminary plats.

  **Sec. 10.04.021 Requirements for construction plans**

Information indicating the manner in which the provisions of this article are to be met shall be submitted with all construction plan submissions or any other plan for improvements which falls under the requirements of [section 10.04.005](#) of this article. All computations, plans, and specifications shall be prepared and sealed by a professional engineer registered in the state.



  **Sec. 10.04.022 Requirements for final plats**

The easements or separate lots required for detention facilities shall be shown on the final plat. The control elevation for each detention facility shall be shown on the plat near the detention facility.

  **Sec. 10.04.023 Drainage and detention design requirements**



All subdivisions and other proposed improvements which are subject to the provisions of [section 10.04.005](#) of this article shall incorporate such design features as are required in this article. Variation from these requirements shall require the approval of the city planning commission whose action shall be conditioned upon the following:

- (1) That a petition be submitted describing in detail the rationale for the proposed designs change.
- (2) That there are special circumstances or conditions affecting the property under consideration such that strict compliance with the provisions of this article would deprive the applicant of the reasonable use of his land.
- (3) That the variance is necessary for the preservation and enjoyment of a substantial property right of the proprietor.
- (4) That the granting of the variance will not be detrimental to the public health, safety, or welfare or injurious to other property in the territory in which said property is located.

  **Sec. 10.04.024 Maintenance**



Designs of detention facilities will incorporate features which facilitate their inspection and maintenance. The designer shall submit an operation and maintenance (O&M) plan for any detention facility prior to its approval by the city. All privately owned detention facilities may be inspected by representatives of the city at such times as they deem necessary. If deficiencies, or conditions creating nuisances, are found, the owner or homeowners' association shall be required to initiate the

necessary corrections within fourteen (14) days, and all deficiencies shall be corrected within forty-five (45) days.

  **Sec. 10.04.025 Safety features**

Designs of detention facilities shall incorporate safety features, particularly at inlets, outlets, on steep slopes, and at any attractive nuisances. These features shall include, but not be limited to, fencing, handrails, lighting, steps, grills, signs, and other protective or warning devices so as to restrict access.

(Ordinance 2009-04-00645 adopted 4/2/09)

  **Sec. 10.04.026 Specific prohibition and illicit discharges**

(a) No person shall introduce or cause to be introduced into the MS4 any discharge that causes or contributes to causing the city to violate a water quality standard, the city's TPDES permit, or any state-issued discharge permit for discharges from its MS4.

(b) No person shall dump, drain, spill, leak, pump, pour, emit, empty, discharge, leach, dispose, throw, place or otherwise introduce or cause, allow, or permit to be introduced any of the following substances in or on any public street, alley, storm sewer, drainage structure, drainage channel, stream, river, pond or any other public property. The following are illicit discharges:

- (1) Any used motor oil, antifreeze, grease, solvents, toxic chemicals, paint, stain or any other petroleum product or waste;
- (2) Any industrial waste;
- (3) Any hazardous waste or infectious waste, including household hazardous waste;
- (4) Any garbage, trash, filth, junk, domestic sewage or septic tank waste, cooking oil, grease trap waste, or grit trap waste;
- (5) Any trash, rubbish, refuse, or wastepaper;
- (6) Any wastewater from a commercial car wash facility; from any vehicle washing, cleaning, or maintenance at any new or used automobile or other vehicle dealership, rental agency, body shop, repair shop, or maintenance facility; or from any washing, cleaning, or maintenance of any business or

commercial or public service vehicle, including a truck, bus, or heavy equipment, by a business that operates more than two (2) such vehicles;

(7) Any wastewater from a commercial mobile power washer or from the washing or other cleaning of a building or mechanical equipment exterior that contains any soap, detergent, degreaser, solvent, other harmful cleaning substance;

(8) Any wastewater from commercial floor, rug, or carpet cleaning;

(9) Any wastewater from the saw cutting, wash down or cleaning of pavement that contains soap, detergent, solvent, degreaser, emulsifier, dispersant, or any other harmful cleaning substance; or any wastewater from the washing or cleaning of pavement where any spill, leak, or other release of petroleum based products, hazardous material, hazardous substance, hazardous waste or other pollutant has occurred, unless all such released material has been previously removed;

(10) Any effluent, overflow or blow down, from a cooling tower, condenser, compressor, emissions scrubber, emissions filter, or boiler;

(11) Any ready-mixed concrete, mortar, ceramic, asphalt base material, hydro mulch material, or any wastewater or substance from the cleaning of any vehicle or equipment containing, or used in transporting or applying, such material;

(12) Any runoff or wash down water from an animal pen, kennel, or fowl or livestock containment area;

(13) Any filter backwash from a swimming pool or fountain;

(14) Any swimming pool, hot tub water, or public interactive water fountain containing disinfectants;

(15) Any discharge from water line disinfection by hyperchlorination or other means unless the disinfecting chemical has been removed or attenuated to the point where it is not a pollutant;

(16) Any fire protection water, not including firefighting water used by the fire department, containing "hazardous materials" as defined in the fire protection and prevention ordinance of the city;

- (17) Any wastewater from a water curtain in a spray room used for painting vehicles or equipment;
- (18) Any contaminated or unpermitted stormwater discharge associated with an industrial activity;
- (19) Any substance or material that will damage, block, or clog the MS4;
- (20) Any release from a petroleum storage tank (PST), or any leachate or runoff from soil contaminated by a leaking PST, or any discharge of pumped, confined, or treated wastewater from the remediation of any such PST release;
- (21) Any petroleum oil, non-biodegradable cutting oil, transmission fluid, hydraulic fluid, brake fluid, power steering fluid, antifreeze or other household hazardous wastes;
- (22) Any rubble, debris, rubbish, tile, concrete, brick, asphalt, or other building material resulting from demolition activities;
- (23) Any ashes or burn refuse;
- (24) Any weeds, grass cuttings, brush, or other yard debris;
- (25) Solid or liquid substances which may cause obstruction to the flow in storm sewers or other interference with the proper operation of the stormwater system;
- (26) Any wastewater from washout of concrete and wastewater from water well drilling operations, unless managed by an appropriate control;
- (27) Any wastewater from washout and cleanout of stucco, paint, from release oils, and other construction materials;
- (28) Fuels, oils, or other, pollutants used in vehicle and equipment operation and maintenance;
- (29) Any discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed by appropriate BMPs; and
- (30) Any kind of other matter that will cause damage to the MS4 or any receiving bodies of water.

(c) Sediment and erosion control:

- (1) No person shall introduce or cause to be introduced into the MS4 any harmful quantity of sediment, silt, earth, soil, or other material associated with clearing, grading, excavation, landfilling, or other construction activities (including any placement, movement, removal, or disposal of soil, rock, or other earth materials) in excess of what could be retained on site or captured by employing sediment and erosion control measures to the maximum extent practicable.
  - (2) No person shall implement erosion or sediment control measures not currently approved by the city.
  - (3) A construction project (commercial, residential, or capital improvement) shall not be considered complete and acceptable by the city until permanent erosion control measures have been installed to the city's satisfaction.
  - (4) No person shall conduct any land disturbing or construction activities:
    - (A) On property over one (1) acre in area without a director-approved erosion control design plan and a TCEQ submitted stormwater pollution prevention plan (SWPPP) for that area on properties 5 acres or greater; or
    - (B) On property less than one (1) acre in area that constitutes more than 50% of the site without a director approved erosion control design plan.
  - (5) No person shall knowingly fail to install or to maintain erosion control devices as shown or represented in the approved erosion control design plan and/or stormwater pollution prevention plan (SWPPP), including maintenance of grass or sod and sediment cleaning of erosion control devices.
  - (6) No person shall allow the build-up of off-site sediment from above or below ground construction related activities in any open space areas.
- (d) No person shall connect or maintain a line conveying sewage, domestic or industrial, to the MS4.
- (e) Any wash water from the service area, garage, or enclosure of a minor auto repair or fuel service station shall not discharge into the MS4.

(f) Regulation of pesticides, herbicides, and fertilizers:

(1) No person shall use or cause to be used any pesticide, herbicide, or fertilizer contrary to any directions for use on any labeling required by state or federal law.

(2) No person shall use or cause to be used any pesticide, herbicide, or fertilizer in any manner that the person knows, or reasonably should know, is likely to cause, or does cause, a harmful quantity of the pesticide, herbicide, or fertilizer to enter the MS4 or waters of the United States.

(3) No person shall dispose of, discard, store, or transport a pesticide, herbicide, or fertilizer, or a pesticide, herbicide, or fertilizer container, in a manner that the person knows, or reasonably should know, is likely to cause, or does cause, a harmful quantity of the pesticide, herbicide, or fertilizer to enter the MS4 or waters of the United States.

(4) If provided with a display notice containing the provisions of this subsection, pertaining to the regulation of pesticides, herbicides, and fertilizers (or a reasonable description thereof), and the information that any user of the product may obtain further information from the director or designated individual, any person selling pesticides, herbicides, or fertilizers at retail or wholesale shall post the notice prominently where it may be read by purchasers of the product.

(g) Used oil regulation:

(1) No person shall:

(A) Pour, spill, leak, pump, empty, leach, dispose, or otherwise discharge used oil into the MS4 or a sewer, drainage system, septic tank, surface water, groundwater, or watercourse;

(B) Knowingly mix or commingle used oil with solid waste that is to be disposed of in a landfill or knowingly directly dispose of used oil on land or in a landfill; or

(C) Apply used oil to a road or land for dust suppression, weed abatement, or other similar use that introduces used oil into the environment.

(2) All businesses that change motor oil for the public and municipal waste transfer stations are encouraged to serve as public used oil collection centers as provided by [V.T.C.A., Health and Safety Code § 371.024](#), as amended.

(3) A retail dealer who annually sells directly to the public more than five hundred (500) gallons of oil in containers for use off-premises shall post in a prominent place a sign provided by the city or by the state informing the public that improper disposal of used oil is prohibited by law. The sign shall prominently display the toll-free telephone number of the state used oil information center.

(h) No person shall have inadequate or unsanitary sewage or plumbing facilities, contrary to the public health, safety or welfare or in violation of the codes and ordinances of the city and state that could pollute the MS4 sewer system.

(i) No person shall introduce or cause to be introduced into the sanitary sewer system any discharge of stormwater, polluted or unpolluted, or any discharge that causes or contributes to causing the city to violate a water quality standard, its agreements associated with the regional sewage treatment plants, or any state issued permit.

(j) Any person that causes a spill, release, or other discharge of a prohibited substance or other pollutant to the MS4 is responsible for the cleanup and removal of the substance from the MS4 or any area adjacent to the MS4 that is exposed to stormwater runoff. The owner of the property on which the spill, release, or discharge occurred is responsible for the cleanup or removal of the substance from the MS4 or any area adjacent to the MS4 if the person that caused the spill, release, or discharge to the MS4 is unknown.

(k) Sanitary sewer overflows shall be prevented in any way possible. All sanitary sewer overflows shall be reported to the city as soon as the owner, occupant, or person otherwise having control of the sanitary sewer becomes aware of the overflow and to the appropriate federal and state agencies within twenty-four (24) hours.

(l) No person shall store items segregated for separate collection, disposal, recycling or reuse in a manner that allows pollutants to enter the MS4. Drums, dumpsters and polycarts shall be closed, not leaking, and in good condition.

(m) Parking lot storm drain inlets shall be maintained free of trash, litter, garbage, rubbish, grass clippings, leaves, and other debris material.

(n) Trash and litter on any parcel of land shall be collected for appropriate disposal prior to mowing.

(o) The owner, owner's representative, operator, contractor or developer of property shall comply with the TXR150000 general construction permit, Industrial TXR050000 permit or city approved erosion control design plan relating to said property.



  **Sec. 10.04.027 Prohibition of illicit connections**

(a) The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited, including, but not limited to, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.



(b) A person violates this article if such person connects or maintains a line conveying sewage to the MS4.

(c) Connections in violation of this article must be disconnected and redirected, if necessary, to an approved onsite wastewater management system or the sanitary sewer system upon approval of the director.



(d) Any drain or conveyance that has not been documented in plans, maps or equivalent, and which may be connected to the storm sewer system, shall be located by the owner or occupant of that property upon receipt of written notice of violation from the director requiring that such location be completed. Results of these locations are to be documented and provided to the director.

  **Sec. 10.04.028 Responsibility**



The administration of this article shall be the responsibility of the city.

  **Sec. 10.04.029 Interpretation**

In the interpretation and application of this article, the provisions expressed herein shall be held to be the minimum requirements and shall be liberally construed in favor of the city.

  **Sec. 10.04.030 Appeals**

The city council is hereby designated as the appeals board for disputes arising from the application of this article. The council's responsibility shall be to hear appeals where it is alleged by an appellant that there is error in any order, requirement, decision, grant or refusal made by the city in the enforcement of the provisions of this article.

  **Sec. 10.04.031 Penalties**

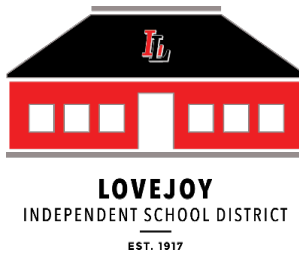
(a) General. Any person, firm, organization, association, or corporation violating any of the provisions of this article, including violation of any variances granted under the authority of this article, shall be deemed guilty of a violation of a municipal ordinance and each such person or other entity shall be deemed guilty of a separate offense for each and every day or portion thereof that any violation of any of the provisions of this code is committed, continued or permitted, and upon conviction of such violation, such person or other entity may be punished by a fine of not less than two hundred and fifty dollars (\$250.00) and not more than two thousand dollars (\$2,000.00).

(b) Additional corrective actions. Any building or structure constructed in violation of the provisions of this article or any use carried on in violation of this article is hereby declared to be a nuisance per se, with any court of competent jurisdiction having the authority to determine that the owner or developer is guilty of maintaining a nuisance per se and to order such nuisance abated. In this connection, the city is hereby authorized to institute any appropriate action or proceeding in any appropriate court to prevent, restrain, correct, or abate any violations of this article.

(Ordinance 2020-06-00914 adopted 6/4/20)

16. Consider and Act on Emergency Closure Pay for 240-250 Day Employees

**Presenter:** Dr. Jennifer DuPlessis, Assistant Superintendent of Finance and Operations



## Lovejoy Independent School District Board of Trustees

<b>Date of Meeting</b>	February 7, 2022
<b>Document Title</b>	Emergency Closure Pay for 240-250 Day Employees
<b>Presented For</b>	<input checked="" type="checkbox"/> Board Action <input type="checkbox"/> Report/Review Only
<b>Supporting Documents</b>	<input checked="" type="checkbox"/> None <input type="checkbox"/> Attached <input type="checkbox"/> Provided Later
<b>Administrator Responsible</b>	Jennifer DuPlessis, Ph.D. Assistant Superintendent of Finance and Operations

### Executive Summary

Most employee groups will make up the emergency closure days that occurred on Thursday, February 3<sup>rd</sup> and Friday, February 4<sup>th</sup> according to their calendars, however, 240 and 250-day hourly, auxiliary staff were already scheduled to work on the makeup days. Board Policy DEA Local allows the Board to authorize paying employees, such as these staff members, who would lose their hourly pay because they were not permitted to report during emergency closure. Because the temperatures were still below freezing throughout the weekend and rescheduling this work day to another Saturday would actually cost more due to overtime pay requirements, we believe it is in the best interest of the district to make these employees whole without a reduction in pay due to emergency closure days. Taking action at this time would prevent reductions in their expected paychecks resulting from the closure. Funds are already budgeted for these work days and our continual custodial vacancies result in savings in this payroll category.

### Fiscal Implications

No fiscal implications. Payroll funds would be used as budgeted.

### **Administrator Recommendation**

It is the recommendation of the Administration that the Board of Trustees approve closure pay for February 3<sup>rd</sup> and 4<sup>th</sup> for 240 and 250-day employees in accordance with Board Policy DEA Local.

### **Board Priority**

#### **Priority 3**

Lovejoy ISD will use established measures to evaluate all areas which impact the student experience. A sustained focus on continual improvement in all aspects of district services remains a constant with the continued goal of providing the highest quality of learning experiences for our students.

#### **Priority 4**

Lovejoy ISD will develop stronger community connections and confidence through effective communication with both internal and external stakeholders.

17. Consider and Act on the Proposed 2021-2022 Academic Calendar Update  
**Presenter:** Katie Kordel, Superintendent of Schools



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT  
EST. 1917

## Lovejoy Independent School District Board of Trustees

<b>Date of Meeting</b>	February 7, 2022
<b>Document Title</b>	2021-2022 Academic Calendar Update
<b>Presented For</b>	<input checked="" type="checkbox"/> Board Action <input type="checkbox"/> Report/Review Only
<b>Supporting Documents</b>	<input type="checkbox"/> None <input checked="" type="checkbox"/> Attached <input type="checkbox"/> Provided Later
<b>Administrator Responsible</b>	Katie Kordel, Superintendent

### Executive Summary

Section 25.081, Texas Education Code, requires that districts provide at least 75,600 minutes of instruction, including intermissions and recess. Additionally, a school district may add additional minutes to the end of the district's normal school hours as necessary to compensate for minutes lost due to school closures caused by disaster, flood, extreme weather conditions, fuel curtailment, or another calamity.

School was closed on February 3 and 4, 2022 due to inclement weather.

Our current academic calendar requires students to attend school on February 21, 2022 and April 18, 2022.

February 21, 2022 is Presidents' Day which is a Federal Holiday.

We are proposing turning the February 17, 2022 early release day into a full school day, not attending school on February 21, 2022, and adding 3 minutes to the beginning of the school day.

-Attending school all day on February 17 rather than having early release adds back 195 minutes.

-Adding 3 minutes to the school day starting on February 14 adds back approximately 135 minutes (Elementary, Intermediate, and Middle School Only).

-Adjusting school start time as follows achieves the addition of minutes.

School	Current Start Time	Proposed Start Time
Hart and Puster	7:55 a.m.	7:52 a.m.
Sloan Creek	7:40 a.m.	7:37 a.m.
Willow Springs	8:45 a.m.	8:42 a.m.
LHS (no change)	8:45 a.m.	8:45 a.m.

**Fiscal Implications**

N/A

**Administrator Recommendation**

Administration recommends a motion to adjust the 2021-2022 school calendar and turn the February 17, 2022 early release day into a full school day and add 3 minutes to the beginning of the school day at the elementary, intermediate, and middle school level starting on February 14, 2022.

**Board Priority**

**Priority 1**

Lovejoy ISD will continue to demonstrate growth in student academic achievement as evidenced by a broad range of academic measures appropriate for the elementary, intermediate, middle, and high school levels. The Lovejoy ISD Graduate Profile (Intellectually Equipped, Open to the Challenges of Learning, Well-Rounded, Engaged in a Healthy Lifestyle, Fair and Respectful of Others, Works for Justice in the Community) will become a prevalent part of all students' pursuits. Students will personify the Graduate Profile by experiencing challenging and engaging learning. Research-based instructional strategies will be strategically partnered with innovation. Profound learning will develop key skills essential to thriving now and in the future. Technology will be leveraged to enhance individualization, deepen learning, and prepare students for an increasingly technology-driven workforce.

**Priority 2**

Lovejoy ISD will continue to strive to be recognized as the employer of choice for educators who believe districts should be defined by a culture of superior work ethic, mission-driven behavior, continuous improvement,

growth mindset, and positive relationships with students, parents, and colleagues. The Lovejoy Educator Profile will become a prevalent part of all members of the team.

**Priority 3**

Lovejoy ISD will use established measures to evaluate all areas which impact the student experience. A sustained focus on continual improvement in all aspects of district services remains a constant with the continued goal of providing the highest quality of learning experiences for our students.

**Priority 4**

Lovejoy ISD will develop stronger community connections and confidence through effective communication with both internal and external stakeholders.

**Priority 5**

Lovejoy ISD will continuously examine and analyze the best practices of implementation for safety and security; enhancing safety and protecting the positive learning environment and by ensuring the personal/social needs of Lovejoy students are addressed.

# Academic Calendar Update

**Board of Trustees Workshop**  
**February 7, 2022**



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT  
EST. 1917

# Schools Closed

**THURSDAY, FEBRUARY 3**

**FRIDAY, FEBRUARY 4**



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT

EST. 1917

# Inclement Weather Decisions

**Why didn't Lovejoy ISD utilize virtual learning during the school closure due to inclement weather?**

The Texas Education Agency does not currently provide an option for school districts to count virtual learning as an instructional day. The funded virtual learning options available to public school districts have very specific criteria that limits this option to a small number of students.

**I have heard that another school district is not having to use their bad weather days to make up missed school days. Why isn't this an option for Lovejoy ISD?**

School districts are required to ensure students attend school for a minimum of 75,600 minutes. Some school districts have built additional time into their school calendar and therefore do not have to utilize make-up days to achieve the minimum minute requirement.

# Inclement Weather Decisions

- Section 25.081, Texas Education Code, requires that districts provide at least 75,600 minutes of instruction, including intermissions and recess.
- A school district may add additional minutes to the end of the district's normal school hours as necessary to compensate for minutes lost due to school closures caused by disaster, flood, extreme weather conditions, fuel curtailment, or another calamity.

# 2021-2022 Academic Calendar



2021-2022

Lovejoy Independent District Student Calendar

Approved 02-22-21

JULY 2021						
S	M	T	W	T	F	S
27	28	29	30	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

AUGUST 2021						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

SEPTEMBER 2021						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

OCTOBER 2021						
S	M	T	W	T	F	S
				1	2	
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

NOVEMBER 2021						
S	M	T	W	T	F	S
1	2	3	4	5	6	
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

DECEMBER 2021						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

JANUARY 2022						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

FEBRUARY 2022						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

MARCH 2022						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

APRIL 2022						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

MAY 2022						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

JUNE 2022						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

February 21, 2022  
Bad Weather Day

April 18, 2022  
Bad Weather Day

Important Dates		Campus Hours		Calendar Key	
AUG 16	First Day of School	<b>Regular Hours</b>			Holiday
SEPT 6-7	Labor Day/Holiday	Elementary Schools	7:55 AM – 3:10 PM		Semester Begins/Ends
OCT 8-11	Fall Break	Intermediate School	7:40 AM – 2:55 PM		Bad Weather Day
NOV 1-2	Holiday/Election Day	Middle School	8:45 AM – 4:00 PM		Early Release All Students
NOV 22-26	Thanksgiving Break	High School	8:45 AM – 4:15 PM		End of Nine Weeks
DEC 17-JAN 4	Christmas Break	<b>Early Release Hours</b>			Student Holiday LHS Only
JAN 17	MLK Day	Elementary Schools	7:55 AM-12:00 PM		Early Release Day/LHS Only
FEB 18-21	Winter Break	Intermediate School	7:40 AM-11:45 AM		
MAR 7-11	Spring Break	Middle School	8:45 AM-12:45 PM		
APR 15-18	Easter Break	High School	8:45 AM- 1:00 PM		
MAY 27	Last Day of School				
MAY 28	Graduation				
Lovejoy ISD • 469.742.8000		Approved by the Board of Trustees 02.22.2021			

# Academic Calendar

## Inclement Weather Impact

School was closed on February 3 and 4 due to inclement weather.

February 21 is Presidents' Day (Federal Holiday)

Our current academic calendar requires students to attend school on February 21 and April 18.

# Proposal

**Turn the February 17, 2022 early release day into a full school day, do not attend school on February 21, 2022, and add 3 minutes to the beginning of the school day.**

- ◆ Attending school all day on February 17 rather than having early release adds back 195 minutes.
- ◆ Adding 3 minutes to the school day starting on February 14 adds back approximately 135 minutes (Elementary, Intermediate, and Middle School Only).

# Proposal

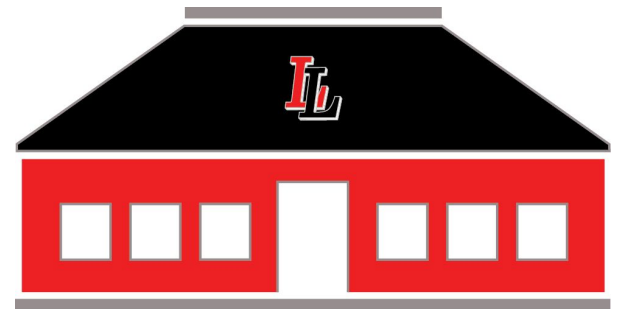
Adjusting school start times as follows achieves the addition of approximately 135 minutes.

School	Current Start Time	Proposed Start Time
Hart and Puster	7:55 a.m.	7:52 a.m.
Sloan Creek	7:40 a.m.	7:37 a.m.
Willow Springs	8:45 a.m.	8:42 a.m.
LHS (no change)	8:45 a.m.	8:45 a.m.

# Recommendation

Administration recommends adjusting the 2021-2022 school calendar by turning the February 17, 2022 early release day into a full school day and adding 3 minutes to the beginning of the school day at the elementary, intermediate, and middle school level starting on February 14, 2022.

# Thank You



**LOVEJOY**  
INDEPENDENT SCHOOL DISTRICT  
EST. 1917

18. Announcements

**Presenter:** Barrett Owens, President

19. Adjournment

**Presenter:** Barrett Owens, President