US Army Corps of Engineers®
St. Paul District

Appendix Q: Risk Assessment

CAP Section 205 Flood Risk Management Study

Arcadia, WI

Final Feasibility Study Report with Integrated Environmental Assessment

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1 Introduction

In accordance with Planning Bulletin PB 2019-04 (“Incorporating Life Safety into Flood and Coastal Storm Risk Management Studies”) and Engineering and Construction Bulletin ECB 2019-15 (“Interim Approach for Risk-Informed Designs for Dam and Levee Projects”), a project delivery team was assembled to identify potential risks to life safety in the study area. After discussion with the Levee Safety Center, the St. Paul District determined that a screening level risk assessment would satisfy the requirement specified in the planning bulletin.

The documents included in this appendix presents the screening level risk assessment.

2 Conclusion

Although the current plot (Figure 1) does not meet TRG1, the system is still considered low risk and the risks associated with the planned levee system are clear. Changes to the NED plan and overtopping frequency would likely lower the cost/benefit ratio and may not provide a substantial change to the screening results. The design team has identified the overtopping section and can implement a managed overtopping section to reduce the risk of a breach with overtopping along other locations on the levee alignment (satisfying TRG 4).

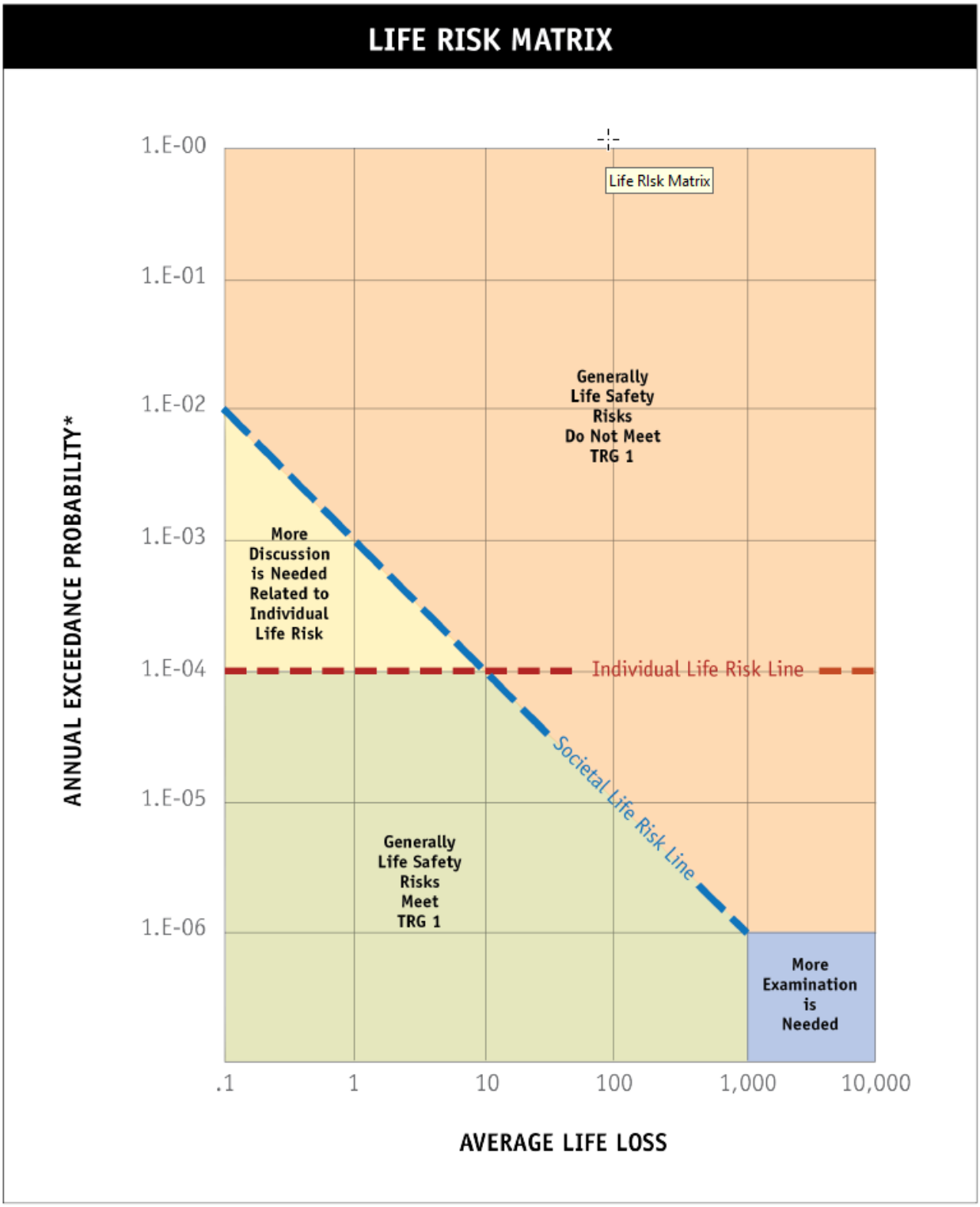

Figure 1. Life Risk Matrix.

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, ST. PAUL DISTRICT
180 FIFTH STREET EAST, SUITE 700
ST. PAUL, MN 55101-1678

CEMVP-ECG March 11, 2020

MEMORANDUM FOR RECORD

SUBJECT: Feasibility Report & Integrated Environmental Assessment for Arcadia, WI – Risk & Uncertainty – Tolerable Risk Guidelines (TRG) 1 & 4 – Screening Level Risk Assessment

In accordance with Planning Bulletin PB 2019-04 ("Incorporating Life Safety into Flood and Coastal Storm Risk Management Studies") and Engineering and Construction Bulletin ECB 2019-15 ("Interim Approach for Risk-Informed Designs for Dam and Levee Projects"), a project delivery team was assembled to identify potential risks to life safety in the study area.

One goal of planning studies is to achieve all four Tolerable Risk Guidelines (TRGs), through the formulation, recommendation, and implementation of cost effective plans that reduce the risk posed by the infrastructure. The extent to which the TRGs objectives can be met vary based on the conditions in the study area and the efficiency and effectiveness of measures that contribute towards meeting the objectives. At a minimum, one alternative that addresses TRG 1 and TRG 4 must be identified. Definitions for TRG 1 & 4 are included below.

TRG 1 – Understanding the Risk. The first tolerable risk guideline involves considering whether society is willing to live with the risk associated with the levee system to secure the benefits of living and working in the leveed area. In other words, answering the basic question – are the risks commensurate with the benefits? The process to evaluate this guideline will include a combination of considering the risk estimates from a risk assessment with qualitative factors.

TRG 4 – Actions to Reduce Risk. The fourth guideline is determining if there are cost effective, socially acceptable, or environmentally acceptable ways to reduce risks from an individual or societal risk perspective. If it is determined that there are no cost effective or acceptable ways to further reduce risks, USACE may consider this an exceptional circumstance and therefore might consider the levee risk to be tolerable even if the life safety risk exceeds the associated tolerability guideline under TRG 1.

The scope and detail for this risk assessment was scalable based on the complexity of the system. For Arcadia, a screening level risk assessment (levee screening) was conducted to meet the requirements of the planning bulletin. The levee screening was based on Plan 3 (NED/TSP Plan is 35,000 cfs).

The risk was determined as a function of the hazards (flood loading), performance (embankments, floodwalls, and closures) and consequences (economic associated with the leveed area) of the proposed system.

The hazard risk for the levee system indicates that the toe would be loaded around the 1-year frequency. Overtopping would occur near a 1000-year frequency. The performance risk of the system is low for embankments, floodwalls and closures. The engineers determined that the proposed structural features, when built in accordance with design criteria, will not have any performance issues that would elevate the risk. Additional exploration during the design phase will be necessary, and any future concerns related to performance can be accounted in the final design. The consequence risk for this levee system is also low. Non-structural measures such as evacuation effectiveness were all very good. Low economic damages and low expected life loss with generally shallow inundation depths all contributed to low consequence risk.

Based on the inputs for the hazard, performance and consequence risks, overtopping of the levee system would present the greatest risk. The associated plot on the life risk matrix falls between the societal life risk line and the individual life risk line (the yellow triangle in Figure 1 below). For the Arcadia screening, the average life loss estimate is still low at 0.3. The plot in the yellow triangle is primarily driven by the overtopping frequency of Plan 3, which is approximately an ACE of 0.001 (1000-yr event). Ideally, the plot for the risk assessment should fall within the green trapezoid indicating that the risk plots below both the societal and individual life risk lines. In order to meet tolerable risk guideline (TRG) 1, ideally it would be beneficial to evaluate the system using a higher overtopping frequency. Risk assessment guidance came out after the TSP/NED plan was identified and due to budget concerns, in addition to scheduling concerns, evaluation of a higher overtopping frequency was not considered. Additionally, considering the smaller leveed area and associated consequences with the Arcadia levee system, evaluations of a higher overtopping frequency may not generate much of a benefit and would likely lower the benefit/cost ratio. As an alternative to re-evaluating the system and possibly NED at a higher frequency, it may be more optimal to consider a designed, armored overtopping section in the final design. Therefore, recommendations for the Arcadia levee system are as follows:

- Increase the NED plan to a 10,000-year frequency in order to shift the plot below the individual life risk line and into the green trapezoid.
  -or-
- The current feasibility study (NED/TSP plan) has identified the overtopping location. If the system cannot be raised, suggest designing a managed (armored) overtopping section.

Although the current plot does not meet TRG1, the system is still considered low risk and the risks associated with the planned levee system are clear. Changes to the NED plan and overtopping frequency would likely lower the cost/benefit ratio and may not

provide a substantial change to the screening results. The design team has identified the overtopping section and can implement a managed overtopping section to reduce the risk of a breach with overtopping along other locations on the levee alignment (satisfying TRG 4).

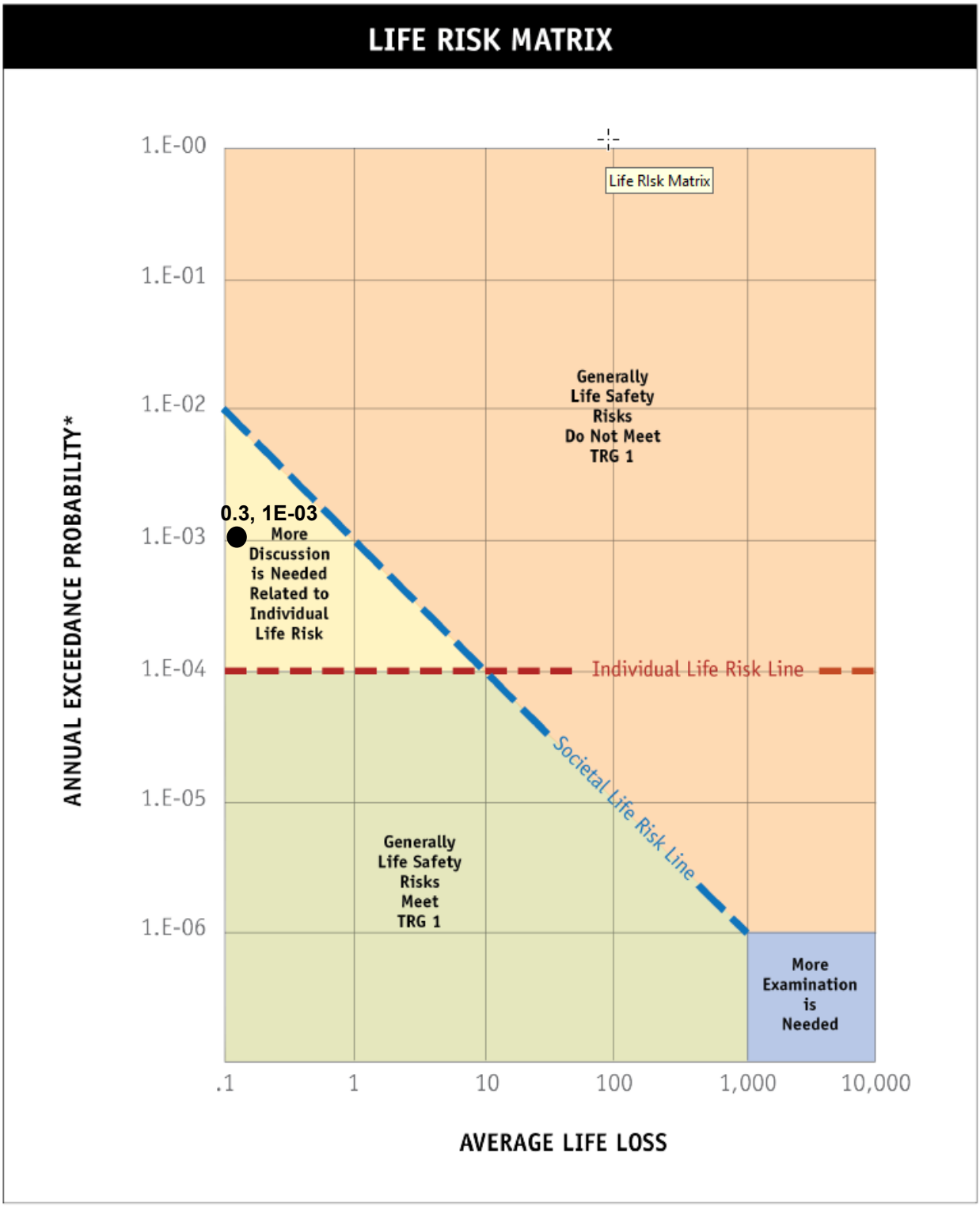

Figure 1. Life Risk Matrix

The USACE point of contact for conditions of this memorandum is the Levee Safety Program Manager (email at LeveeSafetyStPaul@usace.army.mil).

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Eric Wittine, PE
St. Paul District
Levee Safety Program Manager

Trempealeau River – Arcadia, WI

Presenter Name: Eric Wittine

Screening ID : 7177

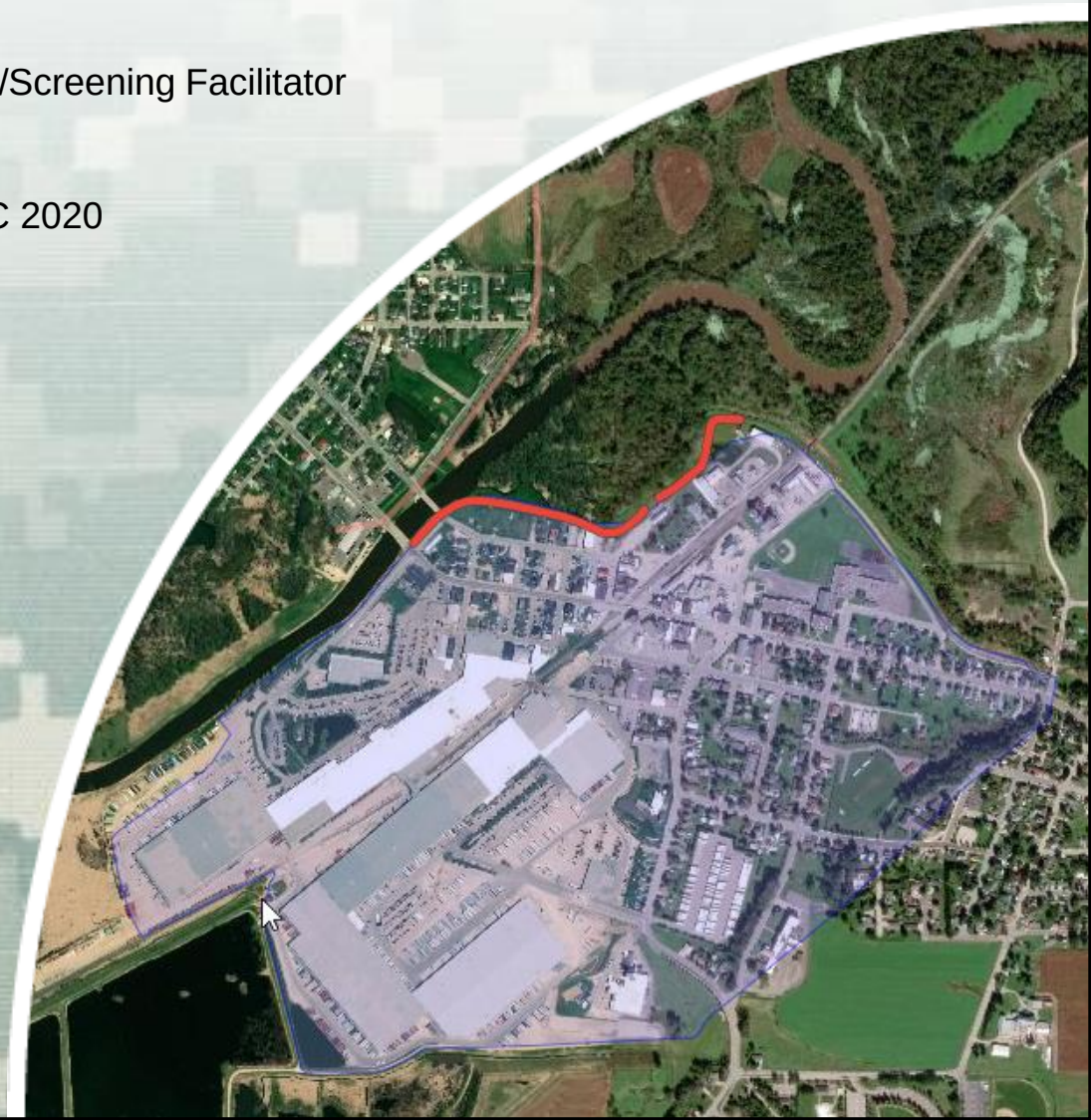
Presenter Title: Levee Safety Program Manager/Screening Facilitator

Duty Location: St. Paul District USACE

Date of Presentation: Wed Jan 29 20:19:24 UTC 2020

NLD System: 5705000040

NLD Segment: 5704000040



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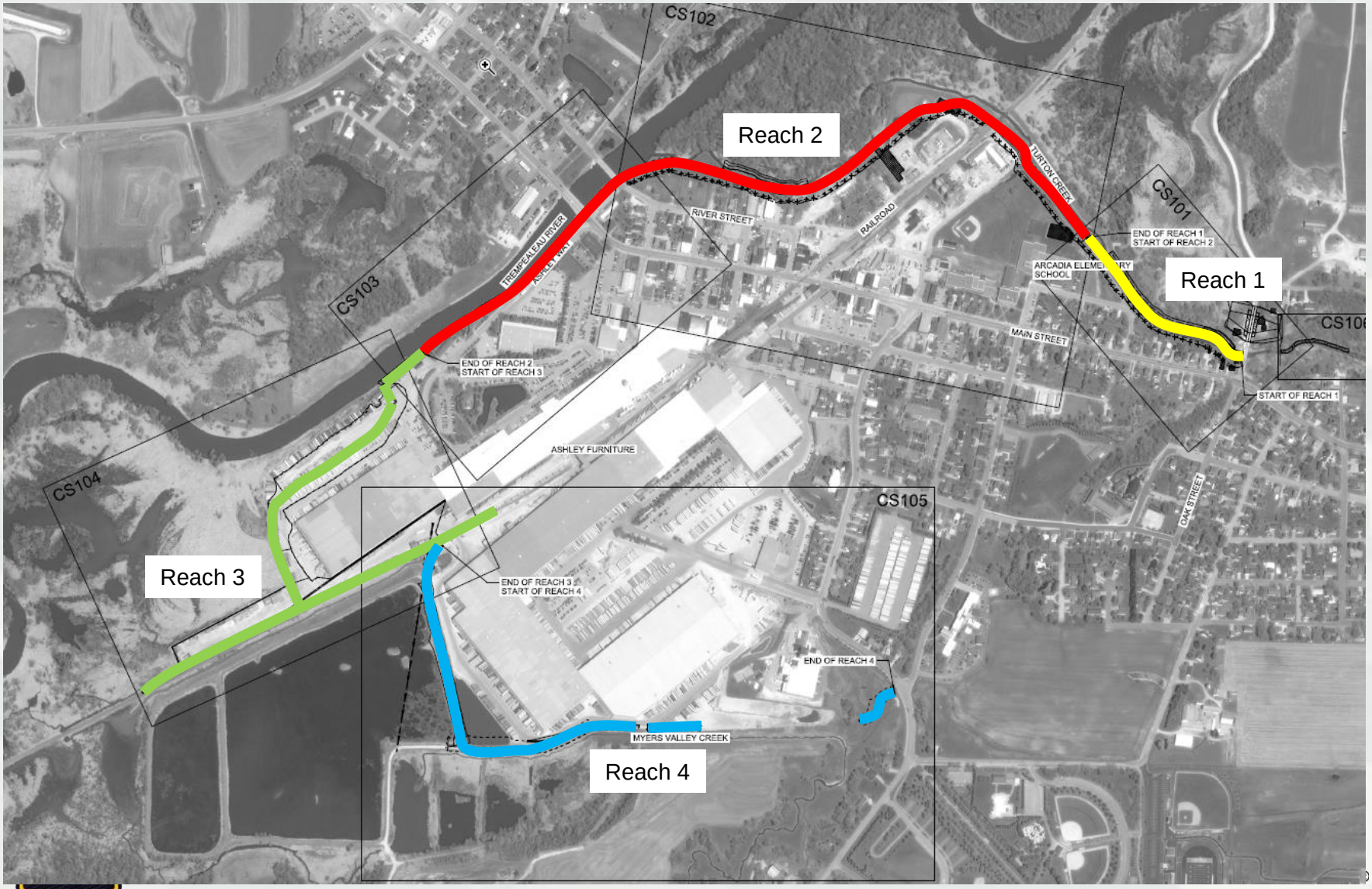
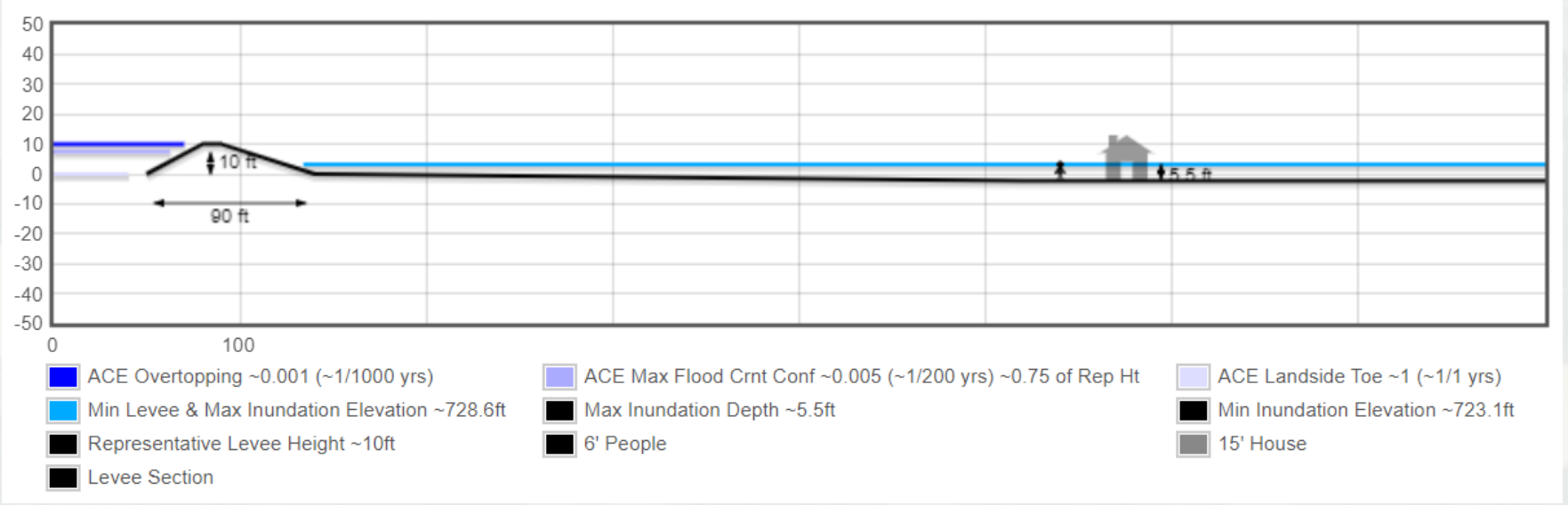
Levee Overview

- USACE District: ST. PAUL
- Trempealeau River - Arcadia
- Identify Segments relationship to Levee System: Segment = System
- Segment ID: 5704000040
- Trempealeau River - Arcadia
- Identity of Owner Operator: City of Arcadia
- Dates of Construction (year): TBD (in planning phase)
- Population at Risk Day: 672, Night: 632

Vicinity/Segment Map – Arcadia, WI



Summary of Hydraulics, Section, General Geotechnical Conditions, Population and Assets



- Hydraulics
  - Toe and Overtopping AEP — ~100% (~1 yr) and ~.1% (~1000 yr)
  - Max Flood w/ Current Configuration — ~75% of Levee Height / ACE ~.5% (~200yr)
  - Overtopped? Breached? — No, No
  - Times Loaded (events) — >25% -0, >50% -0, >75% -0
- Levee Section
  - Height, Crest Width, Slopes — ~10ft, ~10ft, WS ~3:1 and LS ~5:1
  - Embankment Materials — Sand or silty sand materials
  - Foundation Materials — Silt, silty fine sands, sandy/silty clay, and/or organic silt/clay is underlain sands and bedrock.
- Population and Assets
  - Total Population — 672
  - Total Assets — $403,432,830.00

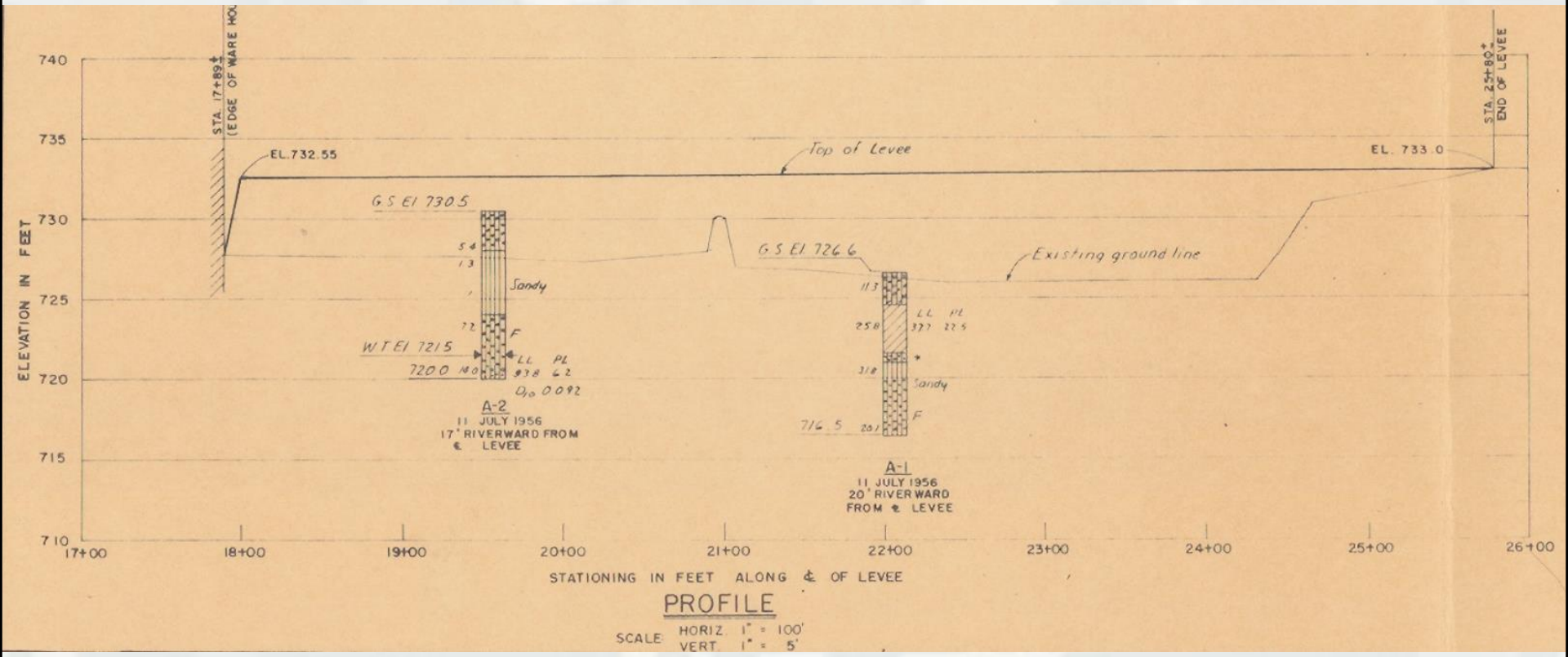
Performance History

There is no documented performance associated with this levee system because the design is still in the planning phase.

The city has experienced several large flood events, beginning as early as 1876. The entire Trempealeau River drainage basin lies within the driftless area of southwest Wisconsin, characterized by rugged ridges and rounded hills. Due to the steep slopes and relatively impervious soils in the watershed, floods in the basin typically have a short duration but rapid rise. The width of the river varies from roughly 120 feet in the lower limits to about 20 feet in the upper limits with fairly uniform normal flow channel depth of about 5 to 7 feet. At Arcadia, bank-full channel capacity is approximately 2,200 cfs. The duration of flows above flood stage at Arcadia generally varies between 2 and 4 days.

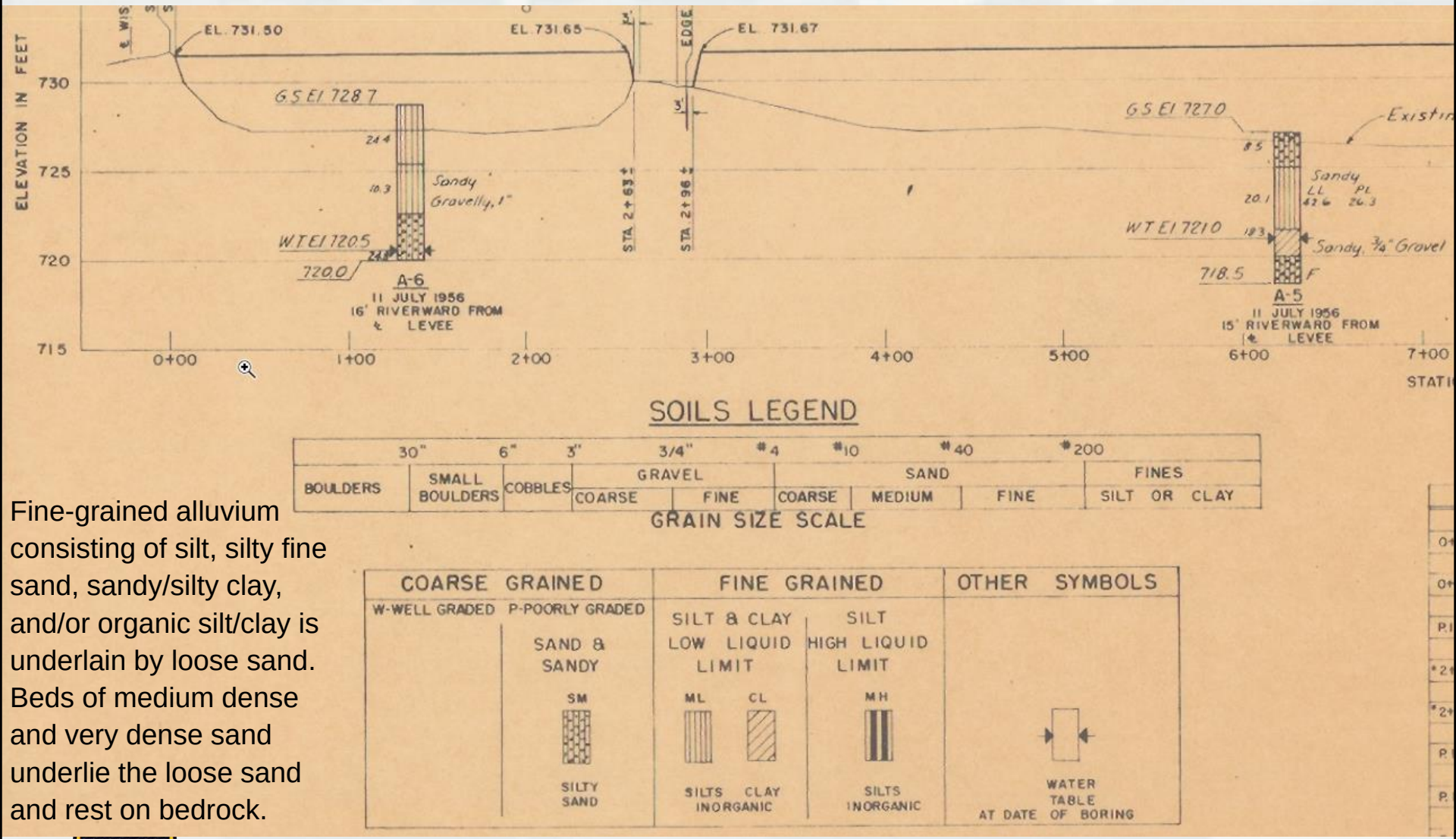
The most recent damaging flood in Arcadia occurred in July of 2017. In a 24-hour period, 5-7 inches of rain fell and much of the city was evacuated. Turton Creek overflowed and eroded Oak Street, cutting off the only access for some homeowners. The creek overtopped the levee and flowed into town. Hundreds of homes and several businesses were severely impacted.

Geomorphology / Foundation Geology



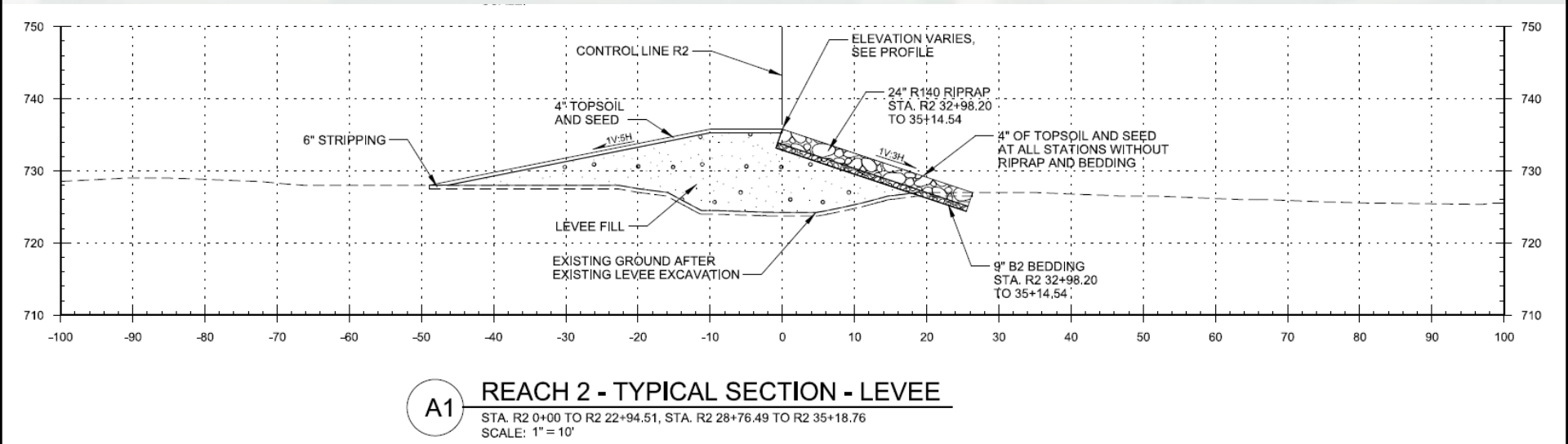
Fine-grained alluvium consisting of silt, silty fine sand, sandy/silty clay, and/or organic silt/clay is underlain by loose sand. Beds of medium dense and very dense sand underlie the loose sand and rest on bedrock.

Geomorphology / Foundation Geology



Fine-grained alluvium consisting of silt, silty fine sand, sandy/silty clay, and/or organic silt/clay is underlain by loose sand. Beds of medium dense and very dense sand underlie the loose sand and rest on bedrock.

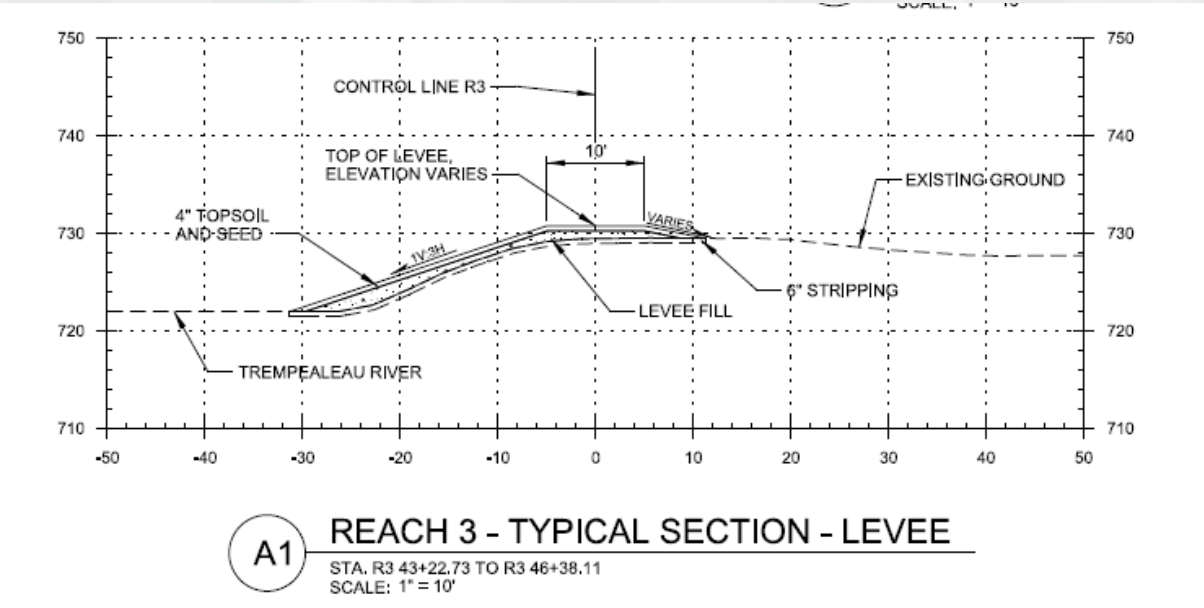
Typical Embankment Section - Turton Creek – Reach 1



A1 REACH 2 - TYPICAL SECTION - LEVEE

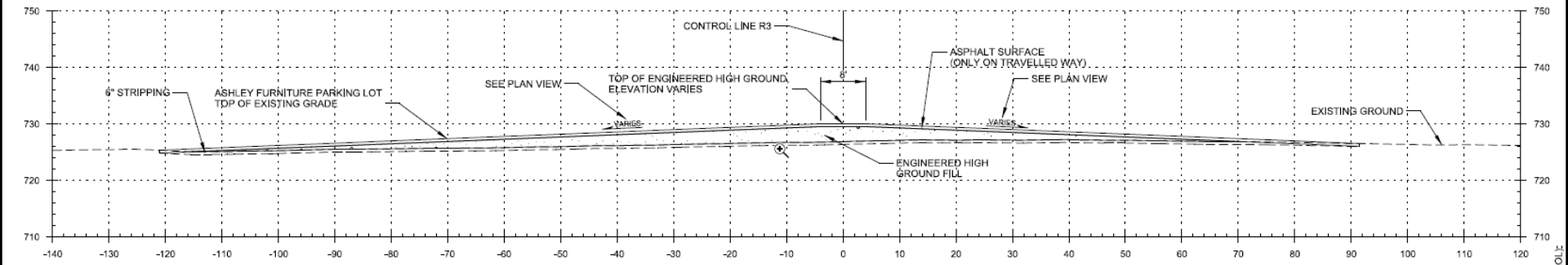
STA. R2 0+00 TO R2 22+94.51, STA. R2 28+76.49 TO R2 35+18.76
SCALE: 1" = 10'

Typical Embankment Section - Reach 3



A1 REACH 3 - TYPICAL SECTION - LEVEE

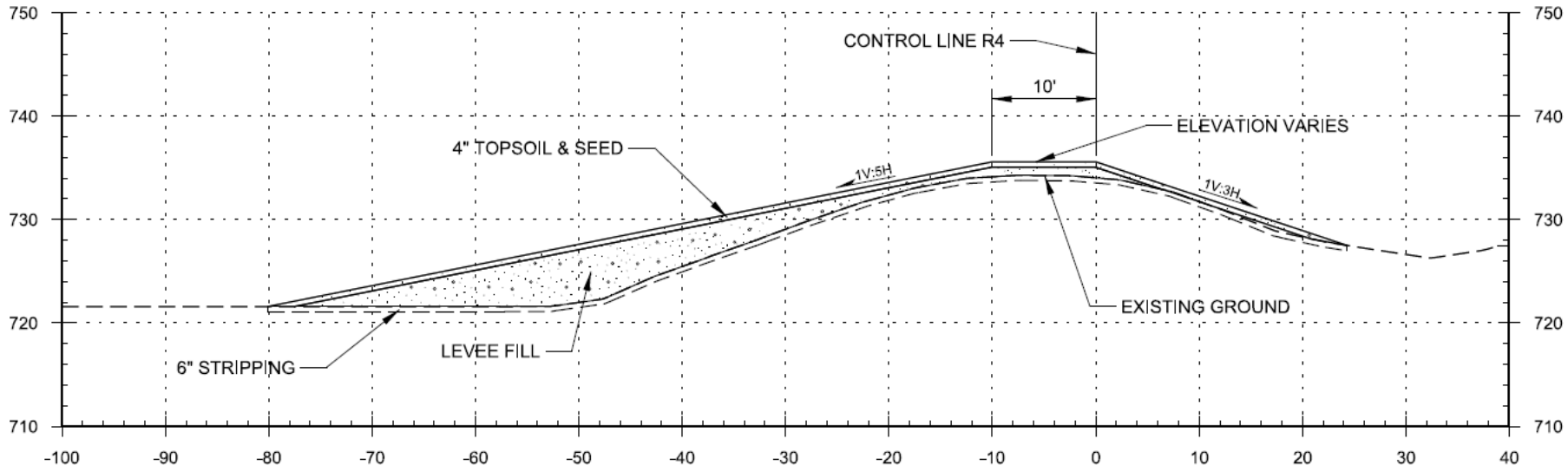
STA. R3 43+22.73 TO R3 46+38.11
SCALE: 1" = 10'



B1 REACH 3 - TYPICAL SECTION - ENGINEERED HIGH GROUND

STA. R3 26+58.74 TO R3 43+22.73
SCALE: 1" = 10'

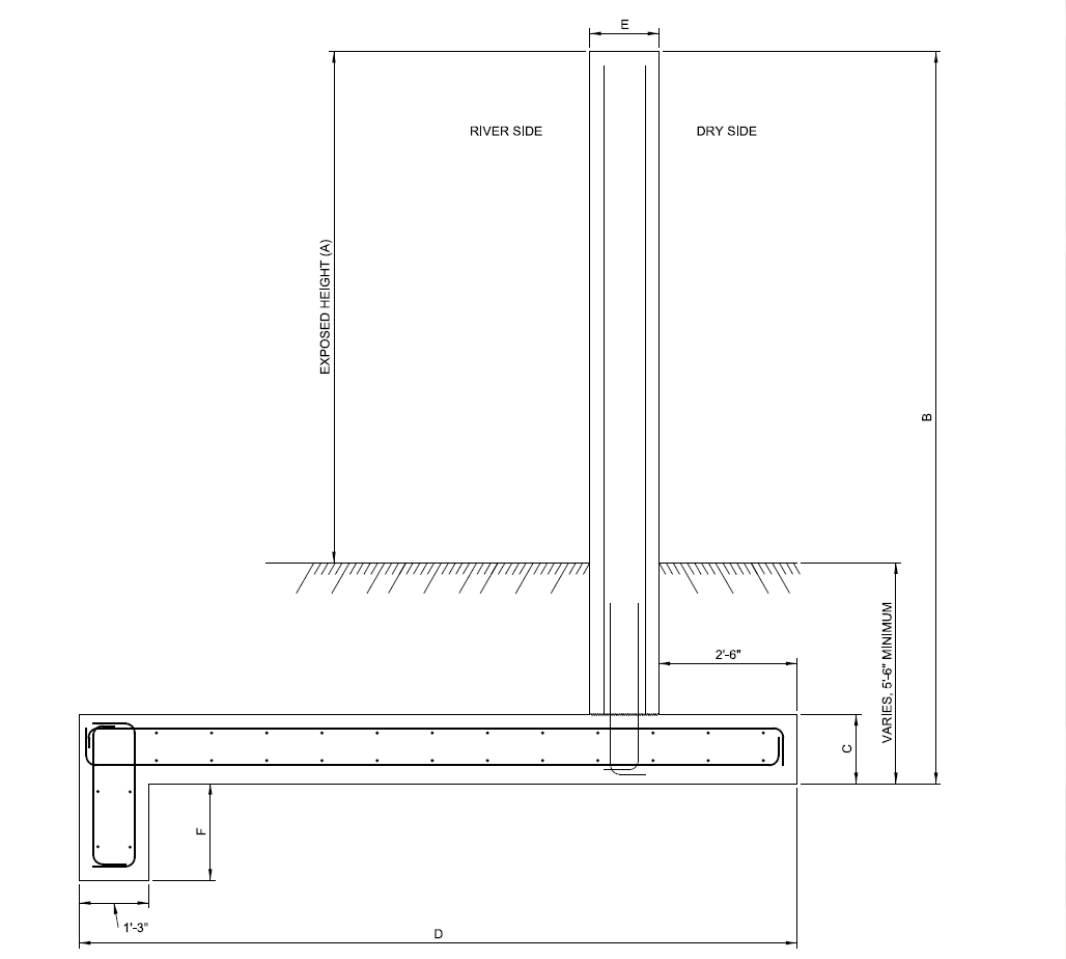
Typical Embankment Section - Myers Valley Creek – Reach 4



C1 REACH 4 - TYPICAL SECTION - MYERS VALLEY RAISE

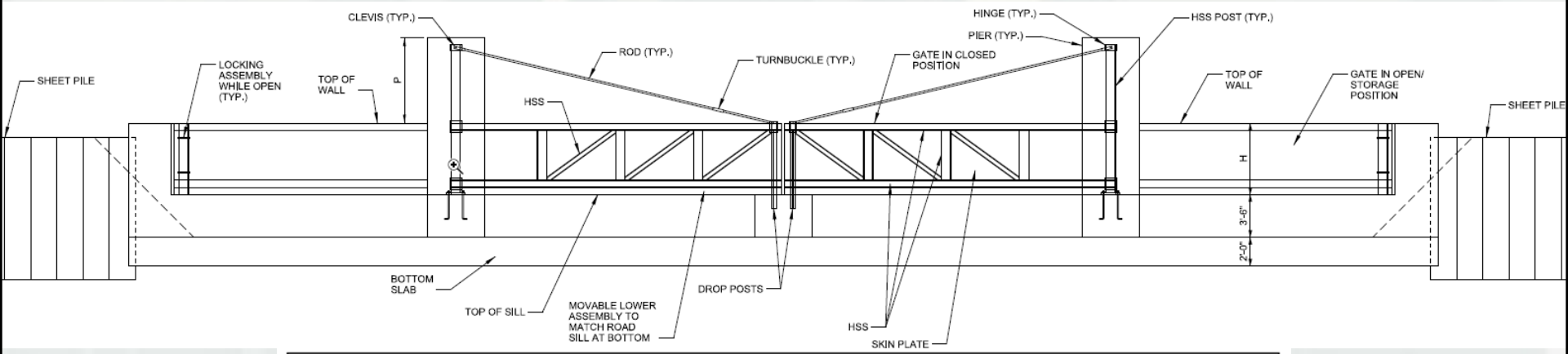
STA. R4 13+46.60 TO R4 22+08.10, STA. R4 25+27.84 TO R4 28+57.84, STA. R4 38+52.75 TO R4 41+56.96
SCALE: 1" = 10'

Typical Floodwall Section – Reach 2



ARCADIA FLOODWALLS						ASHLEY		BETWEEN MAIN & RIVER STREET	
EXPOSED HEIGHT (A)	B	C	D	E	F	STA.	STA.	STA.	STA.
4.5'	10'	1'-0"	11'-0"	1'-0"	1'-6"	R2 46+00	R2 52+07.32	R2 36+02.43	R2 37+85.30
6.75'	11'-6"	1'-3"	12'-0"	1'-3"	1'-9"	R2 39+31.30	R2 46+00		

Closures – Moveable Gates – Reach 2



ARCADIA CLOSURES					
	L (FT.)	(2L+8) (FT.)	H (FT.)	P (FT.)	W (FT.)
CLOSURES:	CLEAR OPENING	TOTAL LENGTH	HEIGHT	PIER HEIGHT	BASE WIDTH
EAST RAILROAD	42	98	5.5	6	12
RIVER STREET	38	94	4	6	11
MAIN STREET	68	124	3.25	6	11

Assessment Rating Summary
Primary Factors

Embankment & Foundation Seepage and Piping - LL

Embankment Stability - LL

Embankment Erosion - LL

Closure System - LL

Floodwall Stability - LL

Floodwall Underseepage and Piping - LL

Embankment and Foundation Seepage and Piping Assessment Ratings

Performance Mode	ICW Rating	LST Rating	Justification
Embankment and Foundation Seepage and Piping			
Unwanted Vegetation Growth		LL	Justification: Construction of the project will require removal of all unwanted vegetation from the vegetation-free zone.
Encroachment		LL	Justification: Construction will require removal of all buried utilities, fencing, houses, and other encroachments from the levee easement.
Localized Settlement		LL	Justification: Design and construction will account for settlement.
Cracking		LL	Justification: Design will utilize sand or silty sand materials for levee fill, placed using density and moisture controls.
Animal Control		LL	Justification: The assumption is that the non-federal sponsor would create and maintain an animal control program.
Culverts/ Discharge Pipes		LL	Justification: Culverts would be designed using existing criteria, with filters around the landward third of the culvert annulus. It is assumed that culverts would be inspected prior to final construction sign-off and then again on a 5-year inspection cycle.
Underseepage Relief Wells/ Toe/Drainage Systems		LL	Justification: Relief wells were designed in accordance with existing criteria with loading to the top of the levee. Additional investigation is required to refine the seepage mitigation technique and/or number of wells required.
Seepage		LL	Justification: Seepage concerns will be mitigated using relief wells or some other means. Recommendations are provided within the feasibility report for future soil exploration during the engineering and construction phase to better understand seepage conditions along the levee alignment. The number/size/spacing of relief wells may be adjusted following the investigation.
Unsuccessful Floodfighting		LL	Justification: It is assumed that the non-federal sponsor would maintain the project and follow flood inspection requirements outlined in their O&M manual.

Embankment Stability Assessment Ratings

Performance Mode	ICW Rating	LST Rating	Justification
Embankment Stability			
Unwanted Vegetation Growth		LL	Justification: Construction of the project will require removal of all unwanted vegetation from the vegetation-free zone.
Encroachment		LL	Justification: Construction will require removal of all buried utilities, fencing, houses, and other encroachments from the levee easement.
Slope Stability		LL	Justification: Stability concerns will be mitigated by embankment geometry, materials and design that reduce the likelihood of sloughing and slides. Additional soil exploration will be conducted during the engineering and construction phase to better understand and potential stability issues along the levee alignment.
Localized Settlement		LL	Justification: Design and construction will account for settlement.
Depressions/ Rutting		LL	Justification: Design and construction will include compaction requirements for building the levee.
Cracking		LL	Justification: Design will utilize sand or silty sand materials for levee fill, placed using density and moisture controls.
Underseepage Relief Wells/ Toe/Drainage Systems		LL	Justification: Relief wells were designed in accordance with existing criteria with loading to the top of the levee. Additional investigation is required to refine the seepage mitigation technique and/or number of wells required. It is assumed the non-federal sponsor would maintain these in accordance with the project operation and maintenance manual.
Unsuccessful Floodfighting		LL	It is assumed that the non-federal sponsor would maintain the project and follow flood inspection requirements outlined in their O&M manual.

Embankment Erosion Assessment Ratings

Performance Mode	ICW Rating	LST Rating	Justification
Embankment Erosion			
Sod Cover		LL	Justification: It is assumed sod cover would be established as part of construction of the project. It is assumed that the non-federal sponsor would supplement areas where seeding does not immediately grow.
Erosion/Bank Caving		LL	Justification: Though underlying materials are conducive to erosion, design includes appropriately sized riprap and bedding materials for areas where anticipated velocities would require additional protection.
Riprap Revetments & Bank Protection		LL	Justification: It is assumed riprap and bedding is sized for the highest anticipated velocities.
Revetments other than Riprap		N/A	Justification: No other revetments anticipated.
Unsuccessful Floodfighting		N/A	Justification: Unknown how erosion could be seen during a flood event at the top of the levee.

Floodwall Stability Assessment Ratings

Performance Mode	ICW Rating	LST Rating	Justification
Floodwall Stability			
Unwanted Vegetation Growth		LL	Justification: Construction of the project will require removal of all unwanted vegetation from the vegetation-free zone.
Encroachment		LL	Justification: Construction will require removal of all buried utilities, fencing, houses, and other encroachments from the floodwall easement.
Concrete Surfaces		LL	Justification: Floodwalls will be part of the new construction for this levee system. The concrete surfaces will be in excellent condition.
Tilting, Sliding or Settlement of Concrete Structures		LL	Justification: Floodwalls will be designed to current design guidance and include all necessary features to limit tilting, sliding, or settlement of the concrete floodwalls.
Foundation of Concrete Structures		LL	Justification: Floodwall foundations will be designed to meet all current design guidance.
Underseepage Relief Wells/ Toe/Drainage Systems		N/A	Justification: These features will not be present along the floodwall reach.
Unsuccessful Floodfighting		LL	Justification: It is assumed that the non-federal sponsor would maintain the project and follow flood inspection requirements outlined in their O&M manual.

Floodwall Underseepage and Piping Assessment Ratings

Performance Mode	ICW Rating	LST Rating	Justification
Floodwall Underseepage and Piping			
Culverts/Discharge Pipes		N/A	Justification: These features will not be present along the floodwall reach.
Unwanted Vegetation Growth		LL	Justification: Construction of the project will require removal of all unwanted vegetation from the vegetation-free zone.
Encroachment		LL	Justification: Construction will require removal of all buried utilities, fencing, houses, and other encroachments from the floodwall easement.
Underseepage Relief Wells/ Toe Drainage Systems		N/A	Justification: These features will not be present along the floodwall reach.
Seepage		LL	Justification: Future soil exploration will be conducted during the engineering and construction phase to better understand seepage conditions along the floodwall alignment. If necessary, seepage control measures will be considered during the design of the floodwalls.
Unsuccessful Floodfighting		LL	Justification: It is assumed that the non-federal sponsor would maintain the project and follow flood inspection requirements outlined in their O&M manual.

CLOSURE ASSESSMENT RATINGS

Performance Mode	LST Rating	Justification
Moveable Gate		
Security	LL	Justification: The gate is in a highly visible location making vandalism unlikely.
Condition	LL	Justification: This gate will be built in the future and will be in excellent condition.
Operating Plan and Experience	LL	Justification: This gate will be constructed in the future. O&M manual will include detailed instructions as to when and how the gate will be closed. Since this is a moveable (swing) gate, experience will not be as important compared to installing more complex closures.
Miscellaneous Issues	LL	Justification: There are no miscellaneous issue to consider.
Unsuccessful Floodfighting	LL	Justification: It is assumed that the non-federal sponsor would maintain the project and follow flood inspection requirements outlined in their O&M manual.

Assessment Rating Summary
Primary Factors

Embankment & Foundation Seepage and Piping - LL

Embankment Stability - LL

Embankment Erosion - LL

Closure System - LL

Floodwall Stability - LL

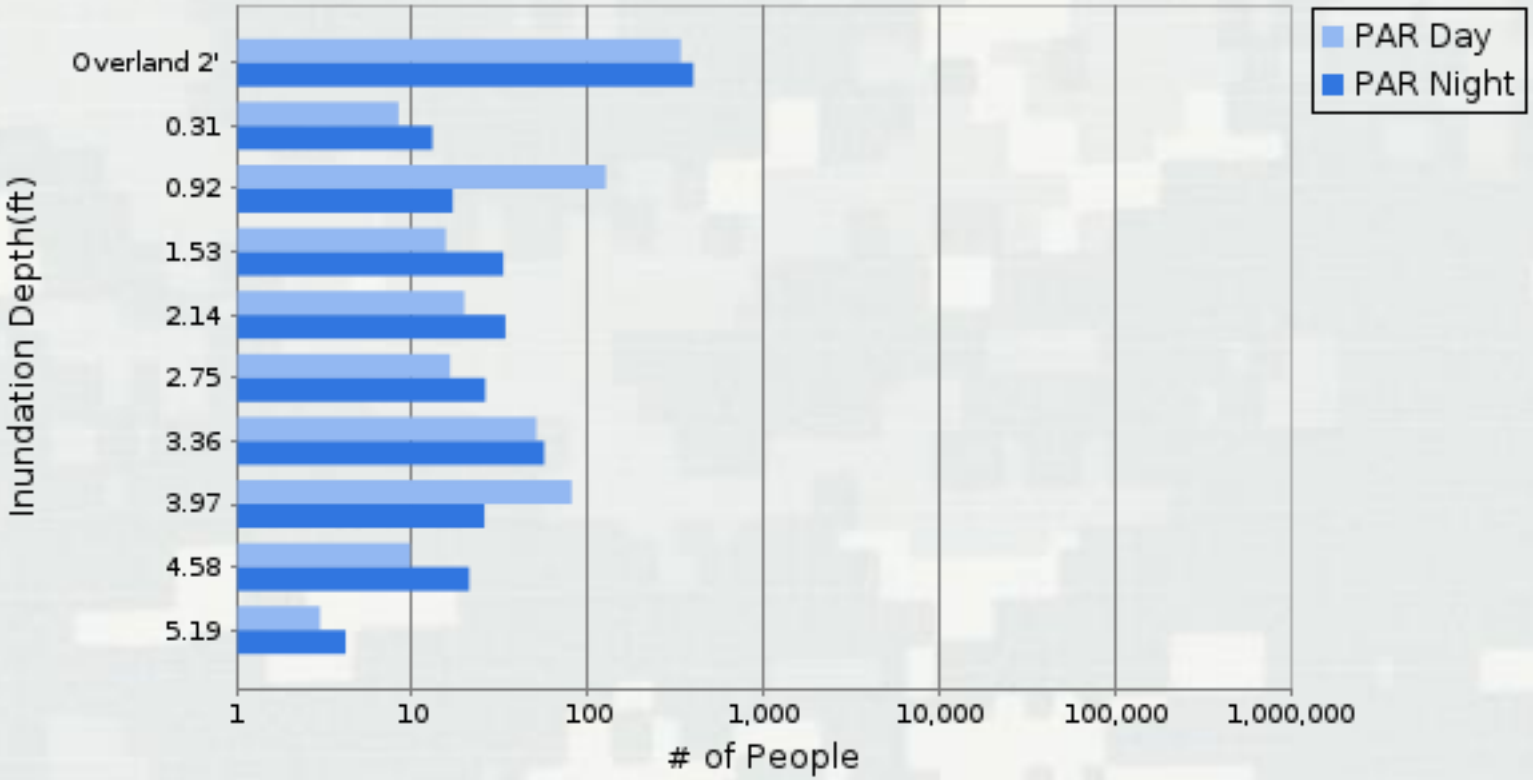
Floodwall Underseepage and Piping - LL

Breach During Overtopping

What is the likelihood that levee will breach during overtopping? ML

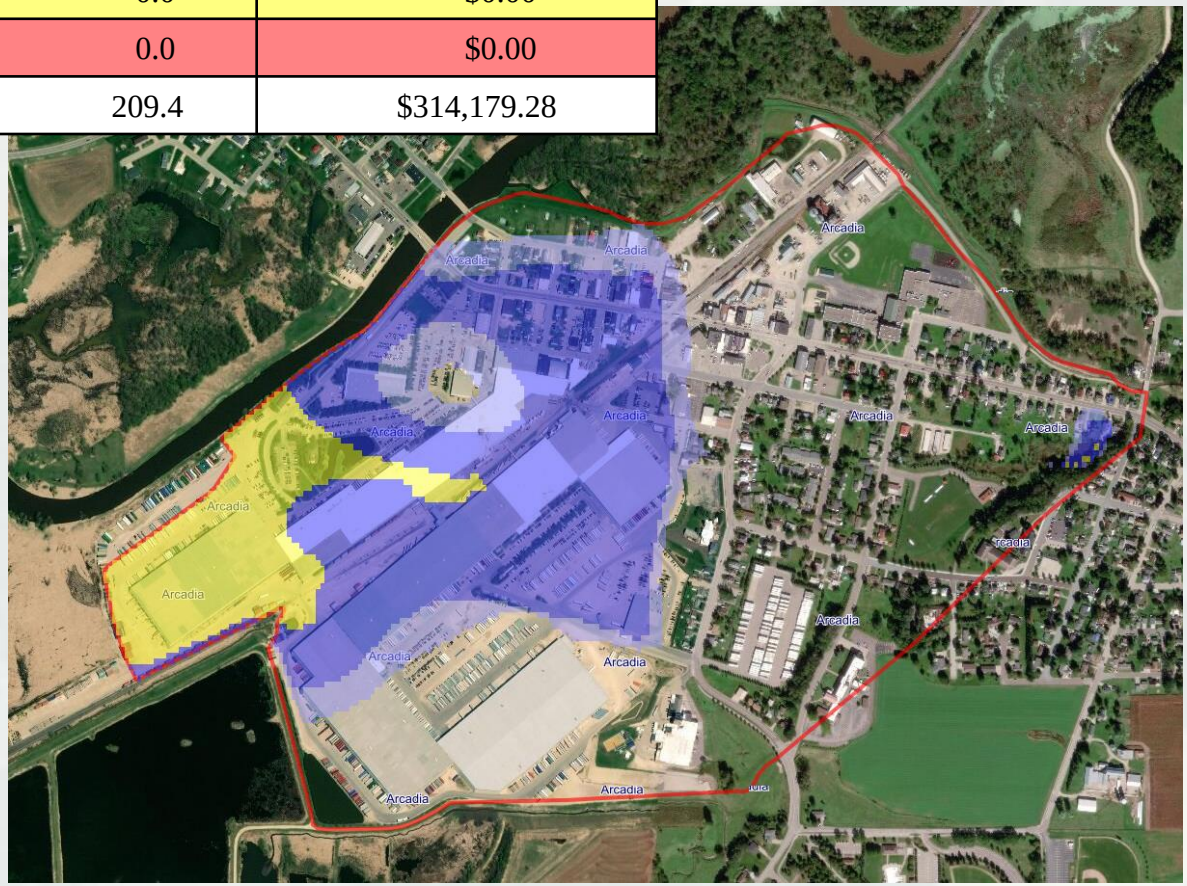
Justification: Additional future soil exploration will still be necessary during the engineering and construction phase to better understand conditions along the levee alignment however based on medium flood durations, it is possible that the system could breach after overtopping. One recommendation of this study is to ensure that the designers considered an armored overtopping section that would likely improve this rated item to LL.

Population at Risk



Potential Flood Impacts

Depth of Flooding, feet	Population at Risk	# of Structures	Property Value ($1,000's)
0-2	490.7	134.0	$132,537.88
2-6	181.5	75.4	$181,641.40
6-15	0.0	0.0	$0.00
> 15	0.0	0.0	$0.00
TOTAL	672.2	209.4	$314,179.28

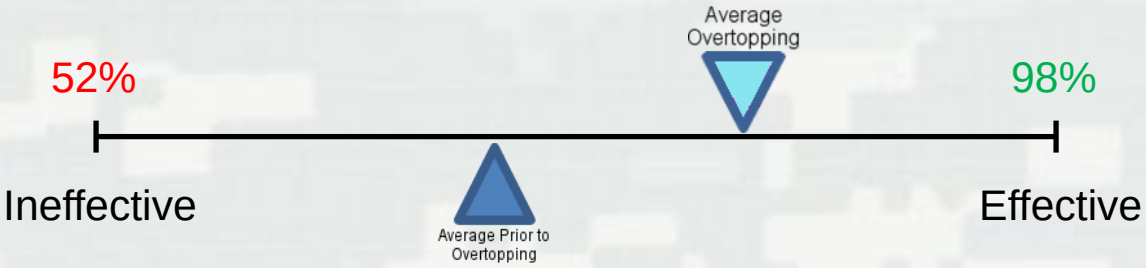


Evacuation Effectiveness

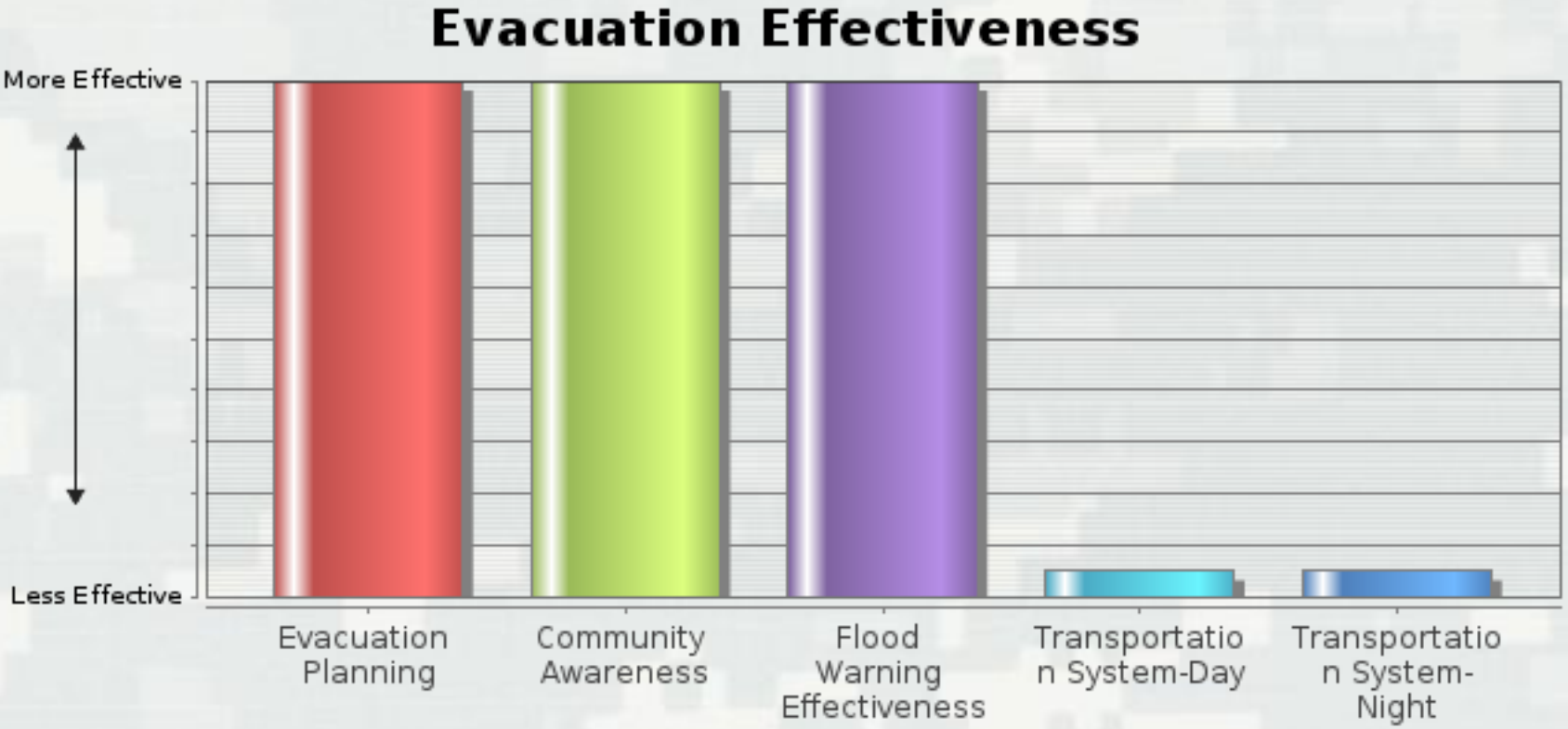
- Evacuation Planning: A (1)
  - The local sponsor will develop a flood specific EAP that is updated periodically. That content will include a description of the flood threat, specific information on the locations at risk, what actions the public should take and how to take them (which evacuation routes to take), when the population should start and complete those actions, and why taking those actions is a good idea.
- Community Awareness: A (.98)
  - The community is very aware that it could be impacted by the breach or overtopping of a levee due to all of the public outreach during the planning phase of this project. It is often a topic in local media. Local flood agencies will routinely provide public education opportunities related to flooding and the role of the levee system.
- Flood Warning Effectiveness: A (1)
  - The future EAP will use multiple warning systems or channels (e.g., auto-dial telephones, Wireless Emergency Alert, sirens, etc) that would be used in the case of a major flood event.

Evacuation Effectiveness (cont.)

- Transportation System Congestion Factor
  - Day: .85
  - Night: .85
- Computed Evacuation Effectiveness Factor
  - Breach prior to overtopping = 71% Day (71% Night)
  - Overtopping= 83% Day (83% Night)



Contribution to Risk: Evacuation Effectiveness



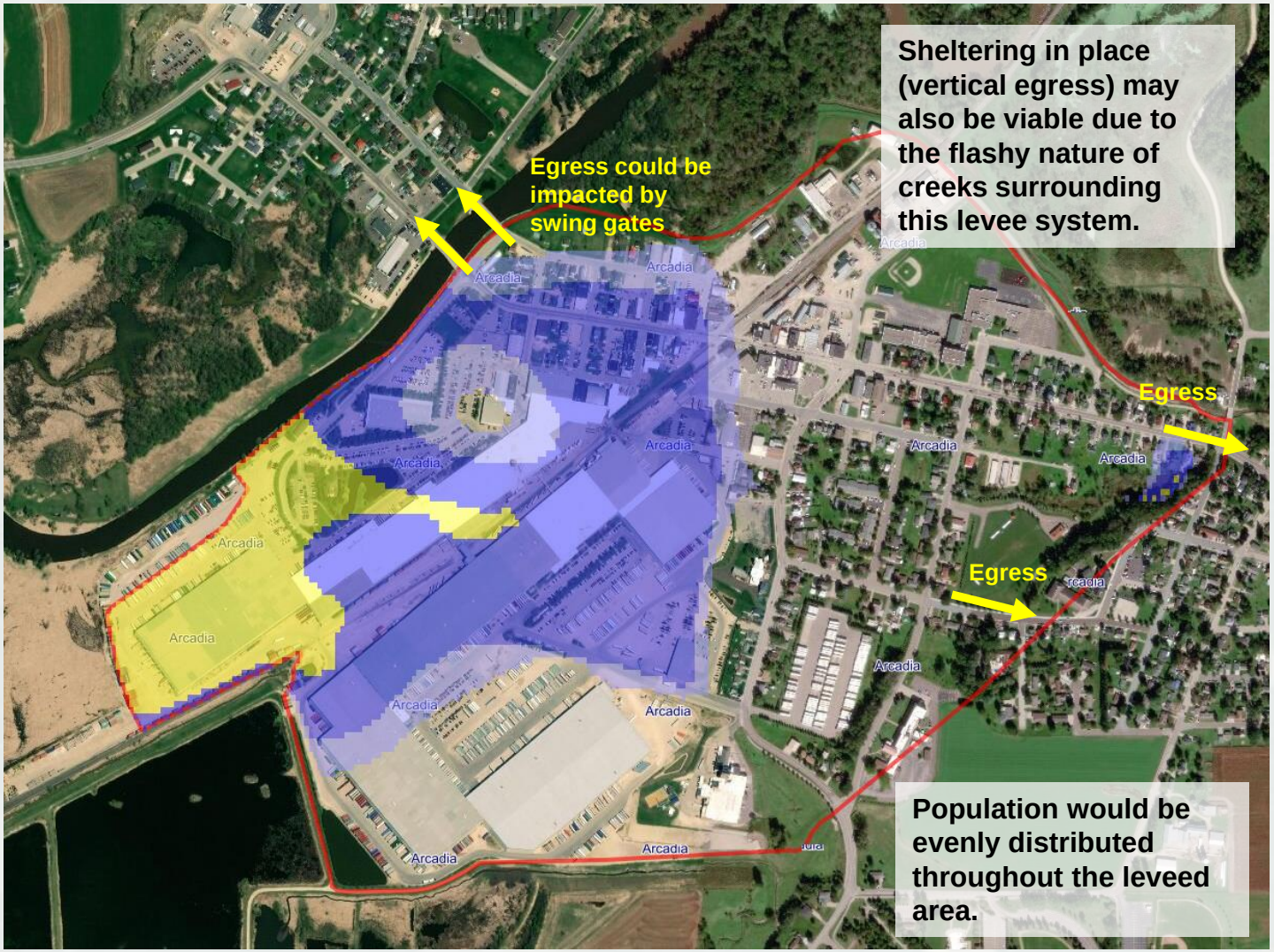
Critical Infrastructure

Infrastructure Type	# of Structures
Ambulance Providers	1
EMS	1
Electric Generating Units	9
Electric Substations	1
Fire Stations	1
Hospitals	1
Law Enforcement	1
Schools	2

Consequence Narrative

- As the LST results demonstrate, the loss of life due to overtopping or breach of the levee system would likely be relatively low. For an overtopping or breach near overtopping scenario, evacuations of Arcadia, WI would be initiated by the city officials. Egress routes are short but could be impacted by the movable (swing) gate closures. The community will have good planning, community awareness, and flood warning effectiveness. For an unexpected breach prior to overtopping, the warning would go out much closer to breach and allow much less time for evacuation. The population at risk during these events should shelter in place due to the relatively low inundation depths throughout the leveed area.
- The Arcadia levee system is located along the Trempealeau River, Turton Creek, and Myers Valley Creek. The leveed area is composed of mixed residential, commercial and industrial (Ashley Furniture) use. Flooding from breach or overtopping of this segment would begin inundating people on structures within minutes of overtopping or breach. Anticipated velocities during major floods could reach ~10 ft/s (and flow velocities through a breach would likely be much higher) but would get lower as the water begins to spread across the basin. The various flood loading sources could carry a large volume of water, and under a major flood there would be enough water to fill a significant portion of Arcadia with sheet flow (2' range). The maximum depth impacting the PAR is approximately 5 feet.
- There is significant critical infrastructure identified for this segment. Life loss estimates and economic damages are considered to be low (Prior – 0.3, OT – 0.5, $93M damages). The index factors for Population Day Index Factor, Population Night Index Factor, Structure Index Factor and the Economic Index Factor were all left at 1.00 for this system. The system min, segment min and segment max were based on the feasibility drawings and profiles for the levee system.

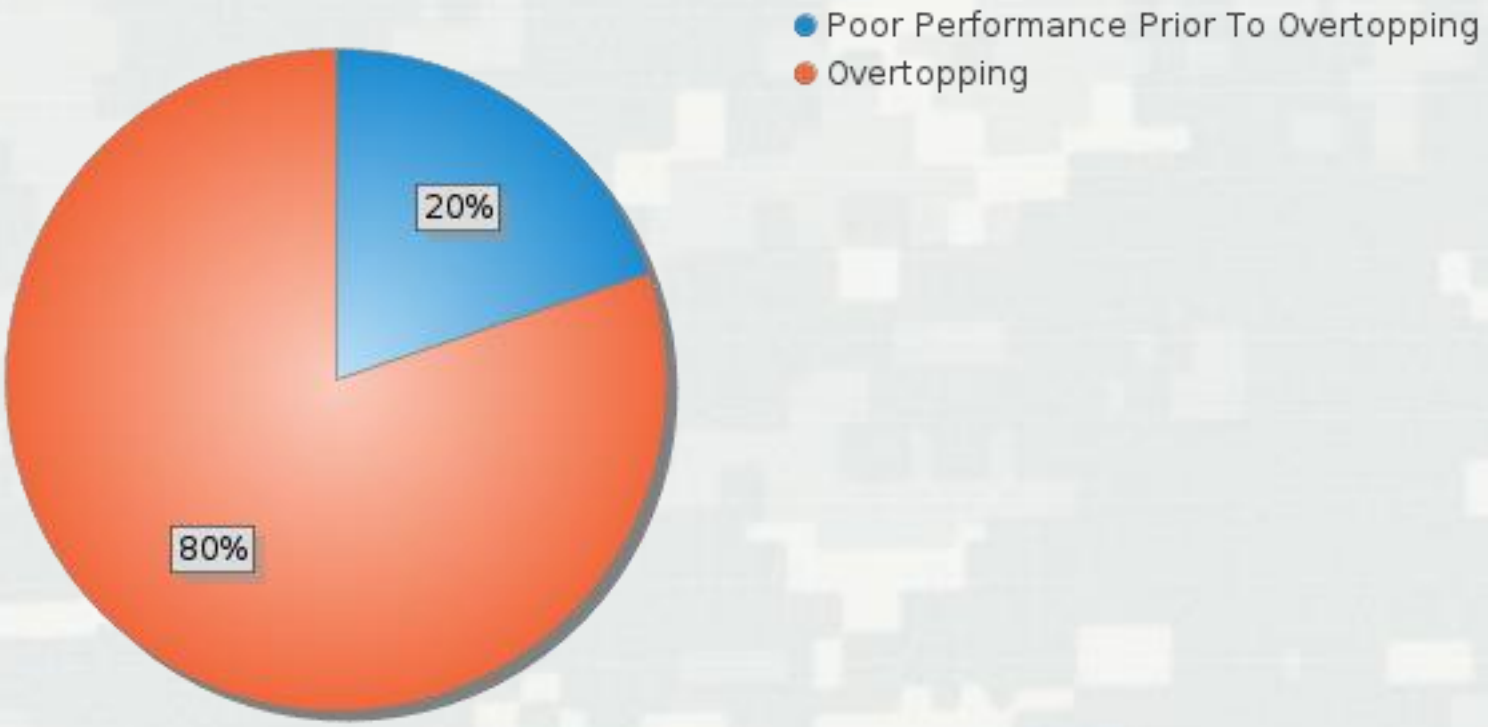
Screening-Level Depth Grid



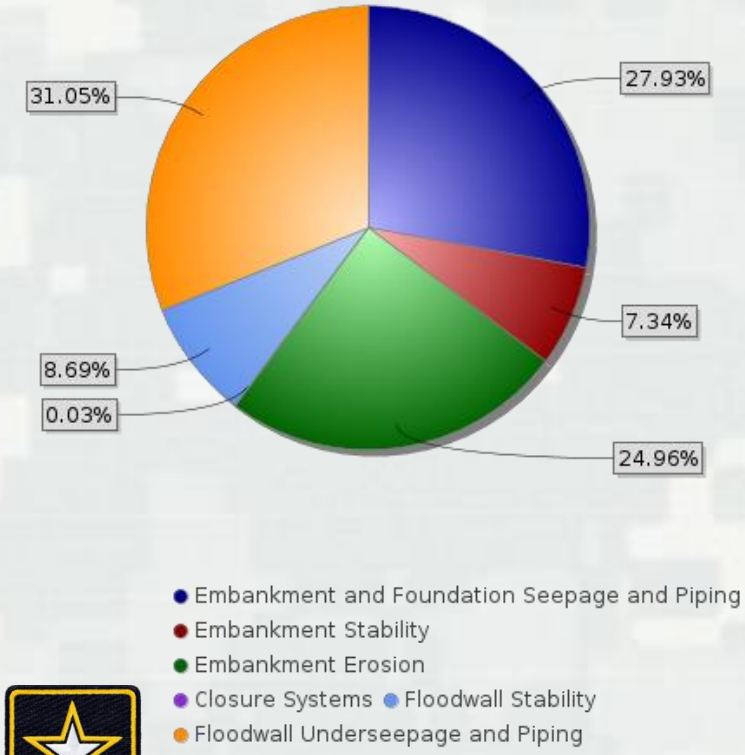
Consequence Data Summary

- Life loss as percentage of PAR : 0.08%
- Threatened Population with Breach prior to Overtopping: Day- 196 Night- 185
- Threatened Population with Overtopping: Day- 112 Night- 106
- Estimated Loss of Life with Overtopping: .3
- Estimated Loss of Life Breach Prior to Overtopping: .52
- Number of Structures Inundated: 209
- Property Damages (in 1000s): $93,300.31

Contribution to Likelihood of Inundation by Flood Scenario



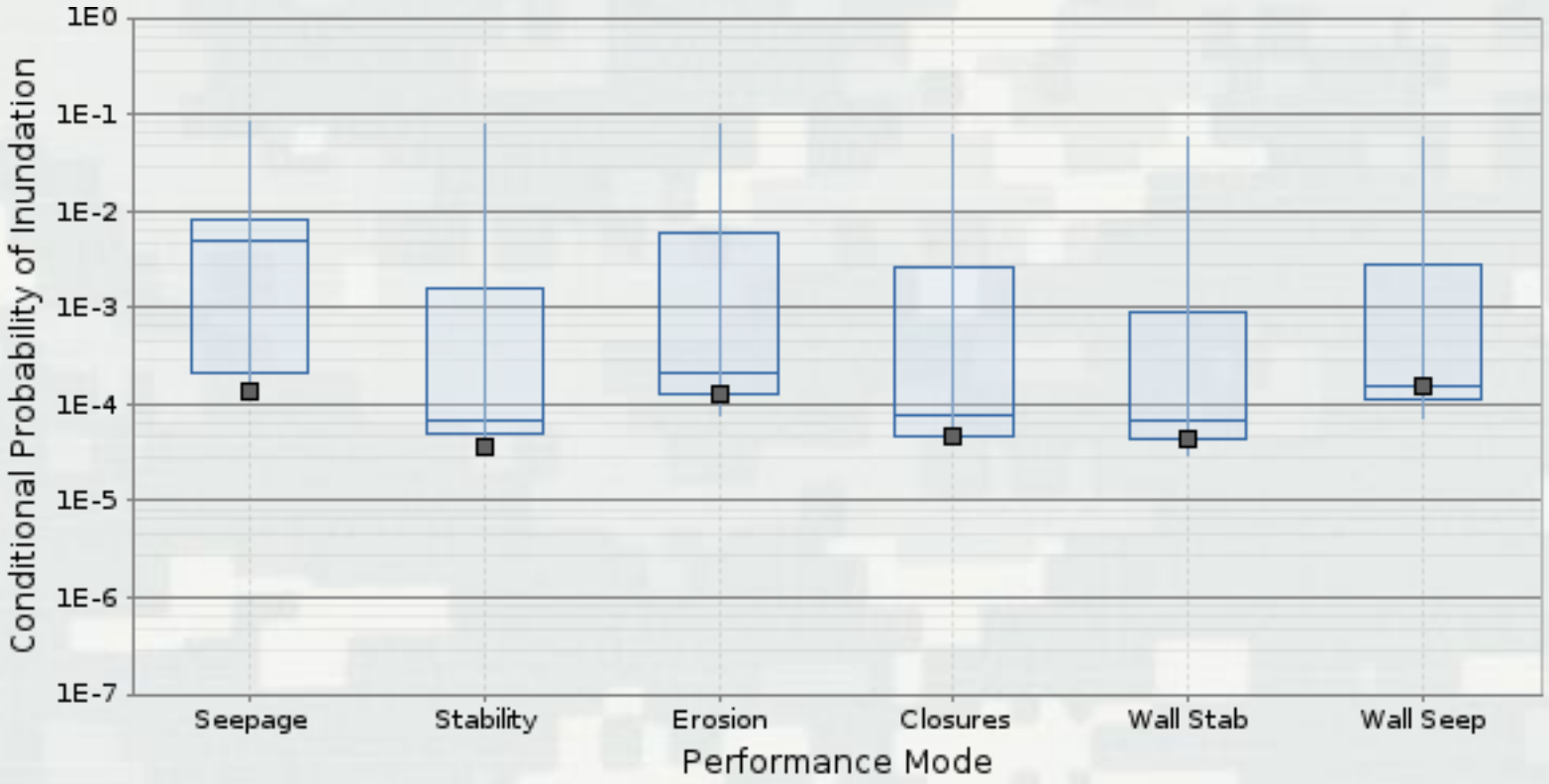
Contribution to Likelihood of Breach Prior to Overtopping



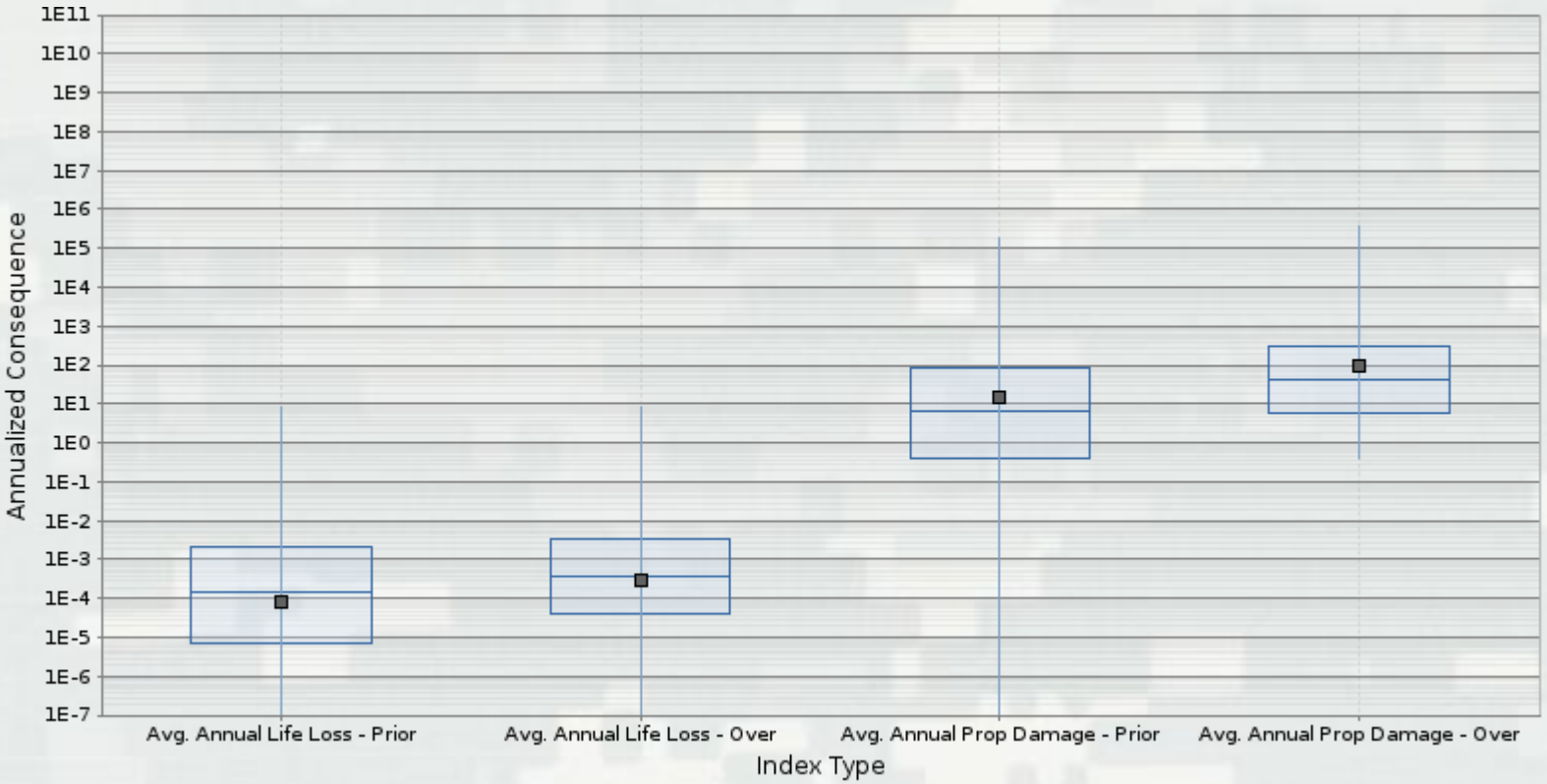
Performance Type	Annual Exceedance Probability	Average Annual Life Loss	Average Annual Property Damage
Embankment and Foundation Seepage and Piping	27.93%	27.92%	27.91%
Embankment Stability	7.34%	7.34%	7.33%
Embankment Erosion	24.96%	24.95%	24.95%
Closure Systems	0.03%	0.02%	0.04%
Floodwall Stability	8.69%	8.70%	8.70%
Floodwall Underseepage and Piping	31.05%	31.07%	31.07%

Major Contributors to Risk Prior to Capacity Exceedance

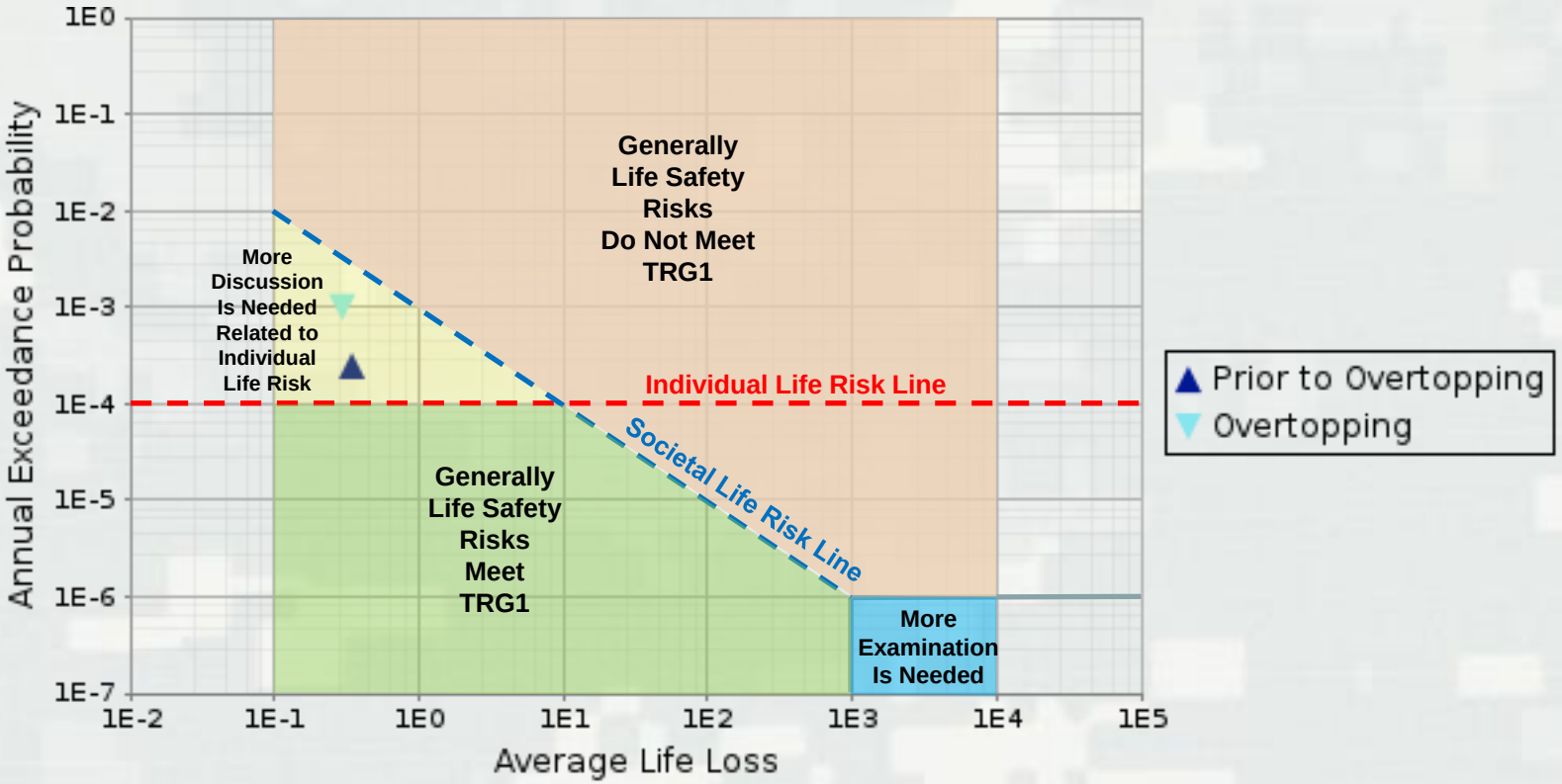
Conditional Probability of Inundation Whisker



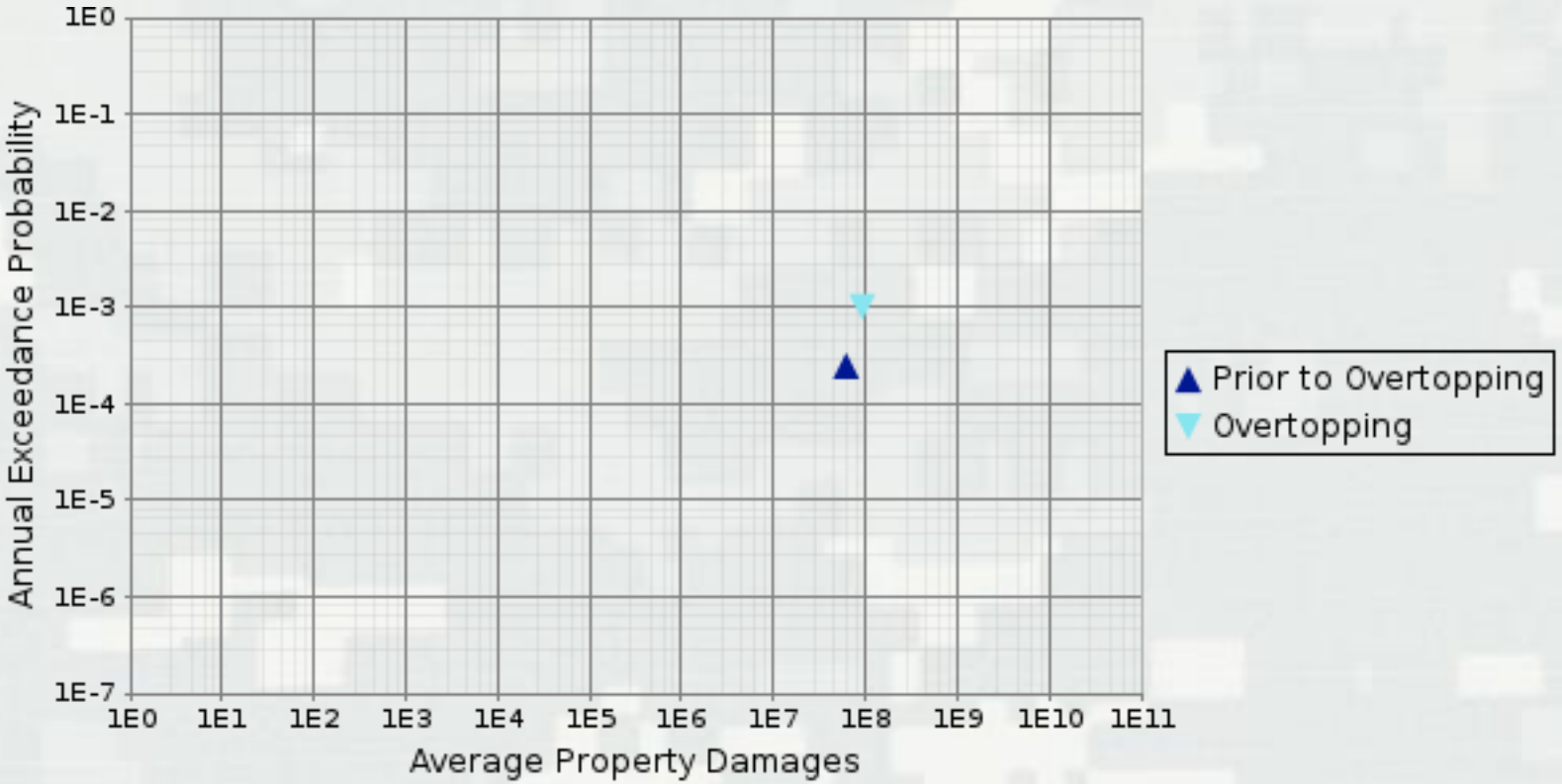
Annualized Risk Whisker



Annual Exceedance Probability vs. Average Life Loss



Annual Exceedance Probability vs. Average Property Damages



NFIP Findings

44 CFR 65.10 Design Provision	Description	Relevant Screening Result		NFIP Finding
Freeboard	*Height of the levee sufficient to meet the freeboard requirements of 43 CFR 65.10 and/or the assurance requirements of EC 1110-2-6067*	H&H/AEP Overtopping	Yes	Positive Finding
Closure Devices for All Openings	*All openings must be provided with closure devices according to sound engineering practice*	All ratings in closure performance module	LL/LL/LL/LL/LL	Positive Finding
Embankment Protection	*No appreciable erosion is expected during the base flood*	Erosion performance mode - Erosion/Bank Caving factor	LL	Positive Finding
Embankment and Foundation Stability	*No seepage into or through the levee foundation and embankment will jeopardize the stability of the levee*	Embankment and Foundation Seepage and Piping/Seepage	LL-N/A	Positive Finding
		Embankment Stability/Slope Stability	LL-N/A	
		Floodwall Stability/Tilting, Sliding or Settlement	LL-N/A	
		Floodwall Underseepage and Piping/Seepage	LL-N/A	
Settlement	*Future settlement will not impact levee's ability to pass the base flood*	H&H/Global Settlement Concerns	No	Positive Finding

Recommendations

- Consider increasing the NED plan to a 10,000-year frequency in order to shift the plot below the individual life risk line and into the green trapezoid.
- Consider where the system overtops for the current NED plan. If the system cannot be raised, suggest designing a managed (armored) overtopping section.