MBK ENGINEERS
Water Resources ◆ Flood Control ◆ Water Rights

MARC VAN CAMP, P.E.
WALTER BOUREZ, III, P.E.
RIC REINHARDT, P.E.
DON TRIEU, P.E.
DARREN CORDOVA, P.E.
NATHAN HERSHEY, P.E., P.L.S.
LEE G. BERGFELD, P.E.
BEN TUSTISON, P.E.
THOMAS ENGLER, P.E., CFM
MICHAEL MONCRIEF, P.E.
NICOLE ORTEGA-JEWELL, PMP

ANGUS NORMAN MURRAY
1913-1985
JOSEPH I. BURNS
1926-2021

CONSULTANTS:
DONALD E. KIENLEN, P.E.

October 14, 2022

Andrea Lobato, P.E., Manager
Delta Levees Program – Special Projects
Department of Water Resources
Post Office Box 942836
Sacramento, CA 94236-0001

Subject: Revised Five-Year Plan
Reclamation District No. 2025, Holland Tract

Dear Ms. Lobato:

On behalf of Reclamation District No. 2025, attached is the final draft of Reclamation District No. 2025, Holland Tract, Five-Year Plan (Plan). The final Plan includes maps, cost estimates, cross-sections, background literature, DWR comments and the District's response to the comments.

If you have any questions, please call me at (916) 456-4400.

Sincerely,
MBK ENGINEERS

Nate Hershey, P.E.

BJ
4275-18 ANDREA LOBATO 2022-10-14

cc: Reclamation District No. 2025
Mr. David A. Forkel (w/o attachments)

October 13, 2022

RECLAMATION DISTRICT NO. 2025 HOLLAND TRACT

2022 FIVE–YEAR PLAN

PRESENTED BY: MBK ENGINEERS
455 UNIVERSITY AVENUE, SUITE 100
SACRAMENTO, CA 95825

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List of Abbreviations

AB – Aggregate Base
CDFW – California Department of Fish and Wildlife
CEQA – California Environmental Quality Act
DFG – California Department of Fish and Game
DRMS - Delta Risk Management Strategy
DWR – California Department of Water Resources
EIR/S – Environmental Impact Report/Statement
FEMA – Federal Emergency Management Agency
HMP – Hazard Mitigation Plan
LAFCO – Local Agency Formation Commission
LiDAR – Light Detection and Ranging
LHA – Levee Habitat Assessment
PG&E – Pacific Gas and Electric
NGVD – National Geodetic Vertical Datum
USACE – United States Army Corps of Engineers
RMA – Routine Maintenance Agreement

Appendices

Appendix A – Maps and Exhibits
Appendix B – Typical Cross Sections, Levee Profiles and Cross Sections
Appendix C – Cost Estimates
Appendix D – Habitat Assessment
Appendix E – Response to Comments

Section 1. Executive Summary

EXECUTIVE SUMMARY

Reclamation District No. 2025 (District), Holland Tract, has prepared this Five-Year Plan (Plan) to support future planning efforts by the California Department of Water Resources (DWR) and local agencies. This plan is comprised of historical knowledge of the District, as well as recent findings and analysis to describe its existing conditions and future plans. This document will serve as a guide for future project development for the District.

The District's goal has been to attain and maintain its levee system at or above a sustainable minimum levee standard. The District's levee system consists of approximately 10.96 miles of non-project levee in the Delta primary zone, including 3.96 miles along Old River/Holland Cut, 4.60 miles along Sand Mound Slough, and 2.40 miles along Rock Slough. There are no non-attributed miles of levee within the District. The existing levee system meets the minimum elevation requirements of the Federal Emergency Management Agency's (FEMA) Short Term Hazard Mitigation Plan[1] (HMP) for an agricultural levee in the Sacramento-San Joaquin Delta (Delta). The District continues to maintain this minimum geometry to remain eligible for federal assistance in the event of a disaster. The District's long-term rehabilitation plans incorporate an increase in the levee dimensions based on geotechnical recommendations to achieve DWR's Bulletin 192-82[2] levee standard, as well as improve overall levee integrity.

With 93 percent cost share from DWR, and approval from the California Department of Fish and Wildlife (CDFW) and other agencies to proceed with planning, documentation, and design, the District can complete all rehabilitation to meet a sustainable Bulletin 192-82 levee standard within five years, subject to funding. To meet the adopted standard, the District will need roughly 32,600 cubic yards of onsite fill and 23,900 tons of imported aggregate base (Appendix B, Quantity Estimate). Engineering, planning, and construction are expected to cost an estimated $9.3 million (Appendix C, Cost Estimate) if onsite borrow material is available. This plan assumes funding will be available under the Delta Levees Special Flood Control Projects Program, also referred to as Special Projects, as the District implements rehabilitation over the identified five-year period. DWR's involvement and any other agencies willing to contribute funding will help the District achieve their goal.

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[1] HMP criteria are requirements to qualify for future federal disaster assistance. Minimum criteria include (1) levees shall have a 1' of freeboard above the 100-year flood frequency elevation, as provided by the USACE; (2) the minimum crown width shall be at least 16'; (3) waterside slopes shall be at least 1.5 horizontal to 1 vertical with revetment in areas where erosion has been a problem; (4) landside slope shall be at least 2 horizontal to 1 vertical, with flatter slopes in the lower portion of the levee in areas where soil stability and seepage have been problems; and (5) the levees shall have all-weather access roads.

[2] Bulletin 192-82 standards are levee standards established by Bulletin 192 published by DWR in December 1982. Minimum standards include (1) levees shall have a 1.5' of freeboard above the 300-year flood frequency elevation, as provided by the USACE; (2) the minimum crown width shall be at least 16'; (3) waterside slopes shall be at least 2 horizontal to 1 vertical with revetment in areas where erosion has been a problem; (4) landside slope shall be at least 3 horizontal to 1 vertical, with flatter slopes in the lower portion of the levee in areas where soil stability and seepage have been problems; and (5) the levees shall have all-weather access roads.

Section 2. Background

FOREWORD

The levee protecting Holland Tract is maintained by Reclamation District No. 2025 (District). The District was formed in April of 1918 to maintain the District's levee system that protects approximately 4,294 acres of agricultural land, local infrastructure and on-island assets. According to LAFCO, Directory of Local Agencies, August 2019, the island has a population of 18 residents. There is no known transient population.

Holland Tract is located in the western Delta in Contra Costa County, south of Franks Tract and Bethel Island, east of Hotchkiss Tract, north of Veale Tract, and west of Bacon Island (Appendix A, Vicinity Map). The District can be accessed by road via Delta Road, or by personal watercraft or barge. The location of the District in the western Delta, and its proximity to flooded Franks Tract, Old River, and Rock Slough combine to make the District's reliability and sustainability of significant value to regional and statewide interests (Appendix A, Regional Infrastructure Map).

The 11-mile-long levee system protects an important variety of land use, primarily used for grazing and habitat. Total assets are estimated at $15.8 million based on the Delta Risk Management Strategy (DRMS) Phase 1 analysis, Section IV. This does not include the land value which is estimated to be approximately $30.0 million according to 2020 data obtained from the Contra Costa County Assessor.

The perimeter levee system protects an important variety of habitat, as documented in the EIR/S for the Delta Wetlands Project, dated September 1995. The habitat located on-island includes riparian (122.1 acres), marsh (287.5 acres), woody, non-native (4.4 acres), herbaceous uplands (660.1 acres), and open water (68.1 acres). The habitat on the island provides numerous benefits to fish and wildlife. Agricultural operations are mainly open pasture used for grazing (2,896.1 acres). Some agricultural operations are seasonally flooded over the fall and winter (Draft Place of Use Environmental Impact Report, 2010).

In accordance with FEMA's Short-Term HMP requirements, the District rehabilitated its levee to the HMP criteria in the early 1990s. The District maintains its levee at or above the HMP standard levee elevation (Appendix B, Typical Cross Section). There is also a well-maintained all-weather road around the District. Given the existing peat foundation thicknesses present in this area of the Delta, the perimeter levee system is susceptible to foundation consolidation thus requiring maintenance to comply with the HMP short-term criteria.

The District's long-term goal is to attain and maintain its levee at or above the DWR Bulletin 192-82 standard for an agricultural levee. Prior to project implementation, the District's geotechnical engineer provides design recommendations for sustainably meeting the selected design standard for an extended period of time based on the existing site conditions. This plan was prepared based on typical design parameters utilized in past projects, and the District can reasonably expect similar design criteria for future projects. Based on these assumptions, several miles of levee require rehabilitation to meet these standards and to protect the resources and key infrastructure

on the island. The District is working aggressively to rehabilitate its levee and has identified reaches of levee requiring rehabilitation.

The District's levee system is important to statewide planning as it is one of the eight western Delta islands determined by DWR to be critical to maintaining water quality in the Delta. A breach in the levee system could result in an unacceptable increase in salinity in the western Delta. This Plan describes the District's intent to reach a sustainable Bulletin 192-82 levee standard within a five-year period. The ability of the District to meet this standard within five years is entirely dependent on funding support from DWR. Holland Cut, bordering the eastern levee, is also a principal freshwater conveyance route from the central Delta to south Delta export facilities.

Assessment of the Status of the Existing Levee System

The District's levee system has historically protected the island from flooding or severe overtopping. There have been multiple instances of seepage or erosion, which have been repaired and improved to maintain the integrity of the levee. The District currently maintains its levee by utilizing funds within the Delta Levees Maintenance Subventions Program (Subventions Program). The District has also performed rehabilitation projects under the Special Projects Program as recent as 2014. The District's goal is to progress towards complete rehabilitation to sustainably meet or exceed the Bulletin 192-82 levee standard. The cost and effectiveness of recent projects indicate that full rehabilitation is attainable within five years with adequate funding from DWR.

Historical Flood Issues

Holland Tract has flooded once since 1900. Flood waters rushing through a levee breach on January 18, 1980 created the blowout pond on the north end of the island. The USACE installed emergency pumps, which operated until April 25, 1980; the water was not drawn down completely until May 5, 1980 (Final EIS, Delta Wetlands Project, 2001). The existing condition of the levee prior to the breach is unknown.

Levee Surveillance and Settlement Instrumentation Program

The District performs a survey of the levee system at least once every five years. This survey includes collecting a data point every 100 feet along the crown centerline as well as taking a full levee cross section every 1,000 feet. Settlement instrumentation is installed on an as-needed basis and as funding is available.

Existing Level of Protection Provided by Levee System

In 1984, the District surveyed its levee as required by FEMA. It was found that portions of the levee crown were as much as 1 foot below the 100-year flood elevation, or 2 feet below the minimum HMP elevation. In addition, portions of the levee crown roadway were not graveled and impassable when wet. Since the passage of Senate Bill 34 (SB 34) in 1988, the District has

raised, and continues to maintain, its levee above the HMP minimum elevation. The District has also constructed and maintains an all-weather gravel access crown roadway around the entire island.

As with any typical Delta island, subsidence of peat has occurred historically on Holland Tract. Generally, subsidence as a result of farming activity does not appear to be occurring close enough to the levee to be of concern from a stability standpoint. The current elevations (2017-2018 DWR Delta LiDAR) of the island are shown in Appendix A, District Elevation Exhibit. The elevations of the island floor generally range from 5 feet to -22 feet (NGVD 29 Datum).

Recent rehabilitation projects have raised and widened the levee to sustainably meet the Delta specific PL 84-99 standard for an extended period of time. However, areas that have not been recently rehabilitated have very little overbuild above the HMP minimum elevation. Consequently, as the underlying foundation material consolidates, the District must continue to add material to the levee crown to maintain minimum elevation standards. The following table identifies existing levee standard conditions.

TABLE 1. EXISTING LEVEE STANDARD CONDITIONS

Levee Standard	**Stationing** (*feet*)	**Total Length** *(miles)*	**Percent Compliant** (%)
At HMP or Above	0+00 to 578+56	11.0	100
At PL 84-99 or Above	Various	9.3	85
At Bulletin 192-82 or Above	Various	7.3	66

Maps identifying the areas meeting HMP, PL 84-99 and Bulletin 192-82 are included in the appendix. Specific stationing for the levee standard conditions is included in Appendix B. There are no miles of levee meeting FEMA NFIP accreditation requirements. All levee work completed has utilized the Subventions and Special Projects Programs since the inception of the Programs.

PREVIOUS FIVE-YEAR PLAN PROGRESS REPORT

SUMMARY OF PREVIOUSLY SUBMITTED FIVE-YEAR PLAN

In 2009, the District's Five-Year Plan consisted of 5 phases of future improvements. Phase 1 included a portion of the north levee along Roosevelt Cut adjacent to Franks Tract from Station 171+00 to 250+00. Phase 2 included the east levee along Holland Cut from Station 55+00 to 167+00. Phase 3 included the remainder of the north levee and a portion of the west levee along Roosevelt Cut from Station 250+00 to 310+00. Phase 4 included the west levee along Roosevelt Cut and Sandmound Slough from Station 310+00 to 370+00. Finally, Phase 5 included

the remainder of the west levee and a portion of the south levee along Sandmound Slough and Rock Slough from Station 370+00 to 440+00.

Status of Projects Submitted in 2009 Five-Year Plan

Since submitting the 2009 Five-Year Plan, the District completed all phases of the planned improvements. Phase 5 was slightly modified to end at Station 430+00 to better conform with existing conditions. Tranquility Bay Road was a logical end of improvements at the time. Additional work to the east would impact the existing marina and was temporarily deferred. Table 2 below provides a summary of the status of the previously proposed projects.

Table 2. Status of 2009 Five-Year Plan Projects

2009 Phase	Standard	Stationing (*feet*)	Completion Date	Objectives Achieved
Phase 1	PL 84-99	171+00 - 250+00	January 2012	Rehabilitated levee; splash berm in designated areas for added protection; encroachments removed
Phase 2	PL 84-99	55+00 - 171+00	November 2013	Rehabilitated levee; encroachments removed
Phase 3	PL 84-99	250+00 - 310+00	August 2014	Rehabilitated levee; encroachments removed
Phase 4	PL 84-99	310+00 - 370+00	August 2014	Rehabilitated levee; encroachments removed
Phase 5	PL 84-99	370+00 - 430+00	August 2014	Rehabilitated levee; encroachments removed

The District completed all phases identified in the 2009 Five-Year Plan and all objectives were achieved.

History with the Delta Levees Program

Participation with Delta Levees Special Projects & Maintenance Subventions Programs

The District is a long-time participant in both the Delta Levees Special Projects and Delta Levees Maintenance Subventions Programs. California Water Code Section 12311(a) directed the Department to "develop and implement a program of flood control projects on Bethel, Bradford, Holland, Hotchkiss, Jersey, Sherman, Twitchell, and Webb Islands…," collectively referred to as the eight western islands. Levee improvements on these islands have been identified as a priority, and the District has participated in the Special Projects Program since its inception and the Subventions Program since 1987. The District completed rehabilitation of

approximately 7.1 miles of levee between January 2012 and August 2014 under the Special Project Program, identified above as Phases 1-5 in the 2009 Five-Year Plan. This rehabilitation included enhanced components, including an armored splash berm along reaches of levee having a long fetch of open water for added protection. A total of five levee rehabilitation projects have been funded by the Special Projects Program, which represents a state fund contribution of $10,138,550. Participation in the Special Projects Program allowed the District to meet the Five-Year Plan objectives. Participation in the Subventions Program and the State assistance received enables the District to maintain the levee system in its current configuration. The entire levee system is eligible for participation in both the Special Projects and Subventions Programs.

Section 3. Plan for Flood Protection

Desired Level of Protection and Strategy to Meet Goal

Desired Level of Protection Planned within Five-Years

The District's goal is to meet the Bulletin 192-82 levee standard within a five-year period. Each project will have specific design recommendations by the District's geotechnical engineer for sustainably meeting the Bulletin 192-82 standard for an extended period of time. DWR conducted studies of levee design criteria suitable for use in the Delta and published its results in 1983 as DWR Bulletin 192-82. The Bulletin 192-82 cross-section recommendations produces a levee that is designed for a water level with a 1 in 300 annual chance of occurrence; including freeboard of 1.5 feet for levees protecting rural areas and freeboard of 3 feet for levees protecting urban areas. The levee system in this case directly protects rural areas, although indirectly facilitates conveyance of fresh water to extensive urban areas. Meeting a sustainable levee standard will provide the necessary levee improvements to help prevent levee breaches or overtopping, and other catastrophic or emergency events. This standard would also likely enable the District to be eligible for FEMA assistance, potentially providing the ability to leverage federal funds in the event of a disaster. Typical levee cross sections are included in Appendix B.

Historically, some reaches of the levees on Holland Tract have incorporated a splash berm which effectively increases freeboard where long wind fetches and high wave action have the potential to occur. The splash berm provides added protection against wave runup and erosion in reaches subject to long wind fetch, and with the Bulletin 192-82 standard provides sufficient freeboard to meet urban criteria.

Extra levee width is provided to accommodate the berms, and additional levee height can be added to achieve or maintain the Bulletin 192-82 standard. This also adds protection against seismic failures and provides a more effective flood fighting platform. This option is typically considered during the design process, utilizing analysis of site-specific characteristics and should be implemented where appropriate.

It should be noted that as the District implements projects to meet the Bulletin 192-82 standard, the levees will also meet the U.S. Army Corps of Engineers PL 84-99 guidelines for rehabilitation of non-federal levees in the Delta, including waterside slopes of 2:1 minimum, landside slopes of 3:1 to 5:1 depending on depth of peat, a 16-foot minimum crown width, 1.5 feet of freeboard above the 100-year flood elevation and a toe drain at a prescribed distance from the landside toe.

Phasing of Work and List of Proposed Projects

The District has phased the work for the Plan according to the existing conditions of the levee structure as well as its geographic location (Appendix A, Project Phasing Exhibit and Appendix B, 500 Foot Conceptual Design Cross Sections). Reaches that currently have lower crown elevations and relatively narrow crown widths or experience stability issues are a higher priority

than other areas. The geographic location of a levee reach is also considered. An example of why this is important is a levee reach that exists adjacent to a wide expanse of open water may be subject to more harsh environmental conditions (e.g. increased wind and wave erosion) than other areas of the levee system.

The proposed rehabilitation plan consists of three phases of construction. It should be noted that the proposed phasing can be modified based on the availability of funds and is intended for use as a planning tool only. The first phase of construction will consist of armoring the waterside slope of the previously rehabilitated levee. The second phase will include raising and rehabilitating the south levee. The final phase of construction includes portions of the levee system that require minimal rehabilitation and will consist primarily of aggregate base (AB) placement on the levee crown.

Phase 1 (Project Phasing Map, Exhibit A) will include armoring the east levee with riprap from Stations 555+00-578+56 and 0+00-171+00 along Holland Cut. Phase 2 will include raising and rehabilitating the south levee from Stations 430+00-555+00 along Rock Slough. This work will impact the existing county-maintained roadway on the levee crown and public access will need to be maintained during construction. Various encroachments and structures will also be impacted. Phase 3 involves raising the crown of the levee and will include placing AB from Stations 555+00-578+56 and 0+00-420+00 to meet Bulletin 192-82 elevation criteria.

TABLE 3. PROJECT PHASING (APPENDIX A, PROJECT PHASING EXHIBIT)

Phase	Standard	Description	Stationing (*feet*)	Current Levee Conditions/ Rationale for Prioritization	Target Completion Date	Anticipated Long Term Habitat Impacts/Mitigation
1	Bulletin 192-82	Armor Waterside Slope	555+00 – 578+56 0+00 – 171+00	Levee previously rehabilitated, waterside slope has insufficient armor	December 2023	No Impacts, Pre-Mitigated
2	Bulletin 192-82	Levee Rehabilitation, Raise Levee Crown	430+00 – 555+00	Low crown elevation, levee crown has settled	December 2024	Impacts TDB, Pre-Mitigated on Landside
3	Bulletin 192-82	Raise Levee Crown	555+00 – 578+56 0+00 – 420+00	Maintain sufficient crown elevation	December 2025	No Impacts, Pre-Mitigated

Various studies and reports are anticipated for each project phase in this plan, including, but not limited to, geotechnical investigations, environmental studies and documentation, plans and specifications, a comprehensive Scope of Work, and a completion report. Once funding is secured, plans and specifications will be developed, and bidding and construction will commence as soon as possible.

To complete all project phases by the end of 2025, funding must be made available progressively starting with funds for the design and construction of Phase 1. Assuming funding

is available, each project phase could likely be completed in one construction season, with planning and engineering occurring in the winter months prior to the commencement of each construction phase. A graphical depiction of the schedule to implement this Plan to attain a sustainable Bulletin 192-82 levee system is included below.

TABLE 4. ANTICIPATED PROJECT TIMELINES

2022	2023	2024	2025
	Phase 1		
		Phase 2	
			Phase 3

ESTIMATED COST TO ACHIEVE FIVE-YEAR PLAN GOAL

Holland Tract has the ability to utilize on-island borrow material for levee rehabilitation projects. Borrow investigations will be required for each phase of construction to locate areas containing suitable material that can be efficiently excavated and transported.

The estimated onsite fill required for levee rehabilitation under this plan is 32,600 cubic yards. It is anticipated that 47,800 tons of aggregate base will be required to maintain the all-weather road surface on the levee crown. Approximately 32,000 tons of riprap will be required to armor the east and south levees. Replacing the county-maintained roadway on the south levee will require approximately 7,700 tons of asphalt concrete. The estimated cost to complete all phases of the Plan and successfully build the District's levee to the Bulletin 192-82 standard using onsite fill is approximately $9.3 million. The quantity and cost estimates to attain a sustainable standard around the entire island are included in Appendices B & C. It should be noted that these quantities and costs are planning level estimates and are subject to final design criteria to be determined as engineering for each phase is completed.

The estimated quantity for the District to meet the Bulletin 192-82 standard was calculated utilizing DWR's Delta LiDAR data (2017-2018) for the Sacramento – San Joaquin Delta. Geotechnical investigations have not been completed for future construction; however reasonable design criteria have been assumed. The assumed design criteria enabled planning level estimates to be generated for purposes of this plan; however, final quantities and associated costs will vary based on the final design recommendations.

As mentioned above, the District's geotechnical engineer, Hultgren-Tillis Engineers, has prepared geotechnical investigations for previous levee rehabilitation projects. Generally,

recommended design parameters have consisted of a minimum 21-foot-wide levee crown[3], constructed 1 foot above the design elevation to account for future settlement as the underlying foundation material consolidates. Water side slopes are a minimum of 2:1 and catch on the waterside levee hinge of the existing crown, resulting in minimal waterside impacts. A 3:1 embankment slope is typically recommended on the landside and is buttressed by a toe berm. An all-weather road surface will be constructed on the subgrade of the new levee crown using Class 2 aggregate base material. The results of this Bulletin 192-82 compliant design have proven that this design is an efficient use of fill and is sustainable for an extended period of time.

The estimated cost for the District to meet a sustainable levee standard was calculated assuming multiple factors that would enable the complete rehabilitation of the levee system. The Cost Estimate summary table in Appendix C provide an itemized breakdown of the cost per phase. The assumptions are based on calculated quantities and a three percent annual increase in construction costs due to inflation. The engineering, design, permitting, coordination and inspection are limited to 20 percent of the total project cost.

POTENTIAL COST-SHARING PARTNERS

The District has a limited ability to pay for large scale rehabilitation projects. The District is allowed to levy assessments for drainage and flood control services based on California Government Code Sections 54710 *et seq*. The method used for apportioning the assessment is based upon the proportional special benefits from the services to be derived by the properties in the assessment area over and above general benefits. The assessment is not based on value, rather benefit. The assessments collected from landowners enable the District to maintain the levee in its current state, with minimal funds remaining for additional activities. Based on data provided by the District, approximately $150,000 per year is available for levee maintenance and related activities. The District can leverage these funds through the Subventions Program, receiving reimbursement of up to 75 percent of eligible expenses, less $1,000 per mile of levee, in accordance with the program guidelines.

The Special Projects program has historically funded large-scale levee rehabilitation on Holland Tract. As a result of the District having very limited financial capacity to fund projects, Special Projects has provided funding for rehabilitation projects with up to 93 percent State cost share for the District. This program is the most viable funding mechanism for financing the rehabilitation of the District's levee system and is essential for the District to implement its five-year rehabilitation plan.

[3] The Bulletin 192-82 levee standard requires a minimum 16' wide crown. Due to settlement over time, minimum levee standards cannot be maintained without additional overbuild incorporated; both vertically and spatially.

Requested Cost-Sharing with the Delta Levees Special Projects Program

Due to the magnitude of the projected rehabilitation costs and the District's limited ability to fund those costs, the District requests a minimum 93% State share of project costs under the Special Projects Program. The requested cost sharing is consistent with previous projects implemented on Holland Tract. Assuming the District's cost share is 7% of the total projected cost, the District would need to provide funding in the amount of $668,416 over the projected five-year period.

Estimated Contribution from Delta Levees Special Projects & Maintenance Subventions Programs

The ability of the District to reach the complete build-out to a sustainable levee standard by the end of five years will depend on the interest of DWR to support the District throughout the process. The District has very limited resources to perform large scale levee rehabilitation projects. The District's annual assessments to fund operations total $319,310. The portion of the assessment revenue that is available for levee maintenance after other expenses are deducted is approximately $150,000. The District can leverage this amount by utilizing DWR's Subventions Program and receive reimbursement for up to 75 percent of qualified expenses, less $1,000 per levee mile in accordance with the program guidelines. It is anticipated that the Subventions Program will allow the District to adequately maintain the levee system, however the ability to fund rehabilitation projects is limited.

A second funding mechanism available to the District is the Special Flood Control Projects Program, also referred to as Special Projects, authorized under SB 34. This program distributes grants to local agencies to construct projects that are selected using a competitive process. Cost shares under this program are variable and are based on various metrics identified in the program guidelines. This Plan is reliant upon the Special Projects Program to fund the identified projects at the requested cost share. Funding from the Special Projects Program is necessary for achievement of the Five-Year Plan goals. The Special Projects Program would need to provide funding in the amount of $8,880,384 over the projected five-year period.

Estimated Contribution from Other Agencies

At this time, the District has no other cost sharing partners to provide funding for rehabilitation and maintenance. Therefore, there is no estimated contribution from agencies other than funding provided by DWR.

There is a possibility of developing a partnership with a coalition of urban water agencies that have a common interest in levees in the future. Previous efforts in the Delta have indicated that a multi-agency approach can be highly successful and achieve multiple objectives. The District will continue its efforts to secure funding commitments from other agencies for future projects when feasible.

Potential Constraints and Obstacles

There could potentially be a multitude of constraints and obstacles throughout the planning, design and implementation of the rehabilitation projects:

- Structures may have to be relocated, or removed from the levee crown and landside levee toe (Appendix A, District Infrastructure Map);
- Multiple siphons will need to be raised and extended along the exterior levee;
- Trees and some vegetation removal may be required;
- The cost of the rehabilitation during the various phases of the projects will vary depending on the additional planning, design, coordination, and permitting required for project construction at each site;
- All projects will require ongoing coordination between the District, landowners, and all agencies involved in the rehabilitation process;
- Coordination may be required with PG&E and other utility providers as the rehabilitation project planning commences along power lines, communication lines, or pipelines.
- Phase 2 will impact the county-maintained road on the levee crown. In-kind replacement of the road surface will be required.

These considerations are typical of rehabilitation projects and the District is well-versed in navigating the various hurdles of a rehabilitation project. The District will openly communicate and work with the various stakeholders to develop solutions that are acceptable to the various Program and project interests.

Due to challenges related to maintenance and public access, the concept of relocating the county-maintained road has been raised. If feasible, the public roadway could be removed from the crown of the levee and a new road constructed on the interior of the island. This alternative would likely be cost prohibitive due to soil instability, right-of-way acquisition and other related factors. Funding would need to be secured to pursue a feasibility study to determine if the concept is viable.

Needed Improvements to Reduce Existing Hazards

Local Assets

The District's levee system protects active agricultural operations, residential dwellings and 2 active marinas with up to 40 inhabitants at any given time on the island. The marinas located on the island include Brentwood Marina and Holland Riverside Marina. Activities related to the marinas include fishing, boating, and waterskiing. The larger of the 2 marinas, Holland Riverside Marina, has various facilities including RV and camping facilities, a fuel dock, a snack shack, 2 launch ramps, 134 covered slips, 230 total slips, and a 500-foot guest dock. The total length of the marina is approximately 6,000 lineal feet. The smaller marina, Brentwood Marina, has a

total length of approximately 2,300 lineal feet has a total of over 80 slips and side ties. Both marinas also have landside storage facilities to support their operations. The marinas provide regional public benefits to recreation and navigation.

A county-maintained road is located on the crown of the south levee and portions of the east levee. The county road provides direct access to Holland Tract and indirect access to Quimby Island. A barge provides transport to and from Quimby Island from the northeast point of Holland Tract. Other transportation infrastructure on-island includes the remainder of the levee crown road maintained by the District and various interior roads used primarily for farming activities and resident access.

A network of approximately 24 siphons divert water for irrigation purposes. The District operates three pumping stations to dewater and manage the water levels on the island. Agricultural lands, primarily irrigated lands, cover roughly 2,900 acres of Holland Tract and are used for livestock grazing. This operation is supported by an on-island farming enterprise with warehouses, facilities, and equipment. Some lands are seasonally flooded, and there is a substantial amount of habitat on the island, adding to the available habitat for resident and migratory waterfowl within the Pacific Flyway throughout the year.

Non-Local Assets and Public Benefits

California Water Code Section 12311(a) directs DWR to develop and implement a program of flood control projects on Bethel Island, Bradford Island, Holland Tract, Hotchkiss Tract, Jersey Island, Sherman Island, Twitchell Island, and Webb Tract. These islands are collectively referred to as the eight western Delta islands. These islands are significant to maintaining water quality in the Delta. A breach in the levee system on one of these islands has the potential to increase salinity levels, potentially halting water exports from the Delta. Not only does the flooding of an island degrade the water quality, it also exposes adjacent islands to additional risks, including erosion from wind and wave action and potential flooding as a result of underseepage. Historically, DWR has concluded that maintaining the integrity of the levee systems of the eight western Delta Islands is a priority.

The levee system that protects Holland Tract also protects major water conveyance features of statewide importance, most notably Old River and Rock Slough. These channels are important conveyance corridors for the Contra Costa Water District intake pumps, as well as the State Water Project and the Central Valley Project delivery systems. The levee system is also connected to the Dutch Slough Dam, also known as the Rock Slough Dam. The Dutch Slough Dam was constructed in 1940 and was part of the Contra Costa Canal construction. The dam with tide gates was constructed to slow the movement of salinity toward the intake pumps, increasing the water quality in Rock Slough. As a result, salinity must spread through Franks Tract and Old River before entering Rock Slough and the Contra Costa Canal. The dam is also used as an emergency evacuation route in the event evacuations are required on Hotchkiss Tract.

Risks for Current Land Use based on Existing Assets

The rehabilitation of the District levee to the Bulletin 192-82 levee standard increases the factor of safety for the island and lowers the potential risk from overtopping or levee breach. By performing the phased projects previously mentioned, the District and the State could alleviate the possible $6.4 million in repair costs due to damages to the District infrastructure, as estimated in the DRMS Impacts to Infrastructure Technical Memorandum.

A detailed risk and uncertainty analysis for the District was not performed for this Plan. The available information that was used came from the methodologies and model used by the DRMS team. The estimated repair costs were provided based on potential flood damage incurred to existing structures and infrastructure. Impacts to businesses, employment, levee repair, and crop damages are unknown at this time, and would depend greatly on when the flood event occurred and how long the island remained inundated, as well as the severity of the flood event.

The District does not maintain records of on island infrastructure to compare to the results of the DRMS technical memorandum. Therefore, it is not the intent of the District to evaluate the results, but merely to report on findings from the analysis and economic modeling that was utilized.

Consequences of Levee Failure or Breach

If flooding occurred as a result of a high-water event, the repair costs would be expected to reach $6,432,000 out of an estimated value of assets at $15,788,000 in 2007 dollars (DRMS, 2007). Adjusting for inflation, those values become $9,840,960 and $24,155,640, respectively, in 2022 dollars. The DRMS report shows that the island currently has 12 single family dwellings, 4 residential – manufactured houses, a bridge, and 52,160 linear feet of roadway. The DRMS report shows a value for the single-family dwelling as $280,000 ($428,400 in 2022 dollars), for residential – manufactured houses as $49,750 ($76,118 in 2022 dollars), and $55 ($84 in 2022 dollars) per linear foot for minor road repair.

The information above was taken from the DRMS Technical Memorandum for Impact to Infrastructure and does not take into account levee repair costs due to the levee breaching or scours. The DRMS stated island value also does not include the value of the land. The total land value, according to 2020 Contra Costa County assessment data, is estimated to be $30 million.

Depending on multiple factors, the repair to the District's levee and drainage system after a levee breach could vary by orders of magnitude. The severity of the conditions during the emergency, the repair of both the interior and exterior of the levee system, drainage facilities, debris removal and contamination cleanup, levee access and utility repairs all need to be considered when evaluating the costs to repair the levee system.

The loss and costs that would impact the agriculture on island could vary greatly depending on multiple factors including the time of year, size and duration of the inundation, water quality conditions, crops planned or planted for that period, and overall market conditions.

Existing Deficiencies in System

Known deficiencies in the system include the unarmored waterside slope on the east levee and some isolated low crown elevations on the south levee. The unarmored slope on the east levee has been prioritized as Phase 1 in this Plan and will help prevent future erosion into the levee prism. The levee has been previously widened and the addition of revetment will help protect previous rehabilitation efforts.

An analysis of the 2017-2018 DWR LiDAR data indicates that a small group of sites, primarily on the south levee, are very close to the minimum HMP criteria for elevation. These sites include the following:

Table 5 - Sites Close to HMP Minimum Geometry

Site	Beginning Station	Ending Station	Length (*feet*)
1	368+76	368+99	23
2	531+51	531+95	44
3	534+09	535+43	134
4	542+90	543+08	18

The south levee was previously rehabilitated in the early 1990s and is relatively wide. A two-lane county-maintained roadway exists on the levee crown. Two marinas are located on the south levee with a variety of encroachments. The accuracy of the LiDAR data is such that it cannot be conclusively determined that the sites are, in fact, below HMP. The potential low areas should continue to be monitored and the LiDAR data should be confirmed with a higher accuracy conventional terrestrial-based survey. If the sites are determined at some point to have actually settled below the minimum HMP elevation, maintenance should be performed to maintain minimum elevation requirements.

Urgency of Repair Work

Rehabilitating the levees to meet the Bulletin 192-82 standard would increase the level of protection for the island and potentially lower the frequency of events requiring an emergency response. Considering the island is part of the previously mentioned eight western Delta islands, safer levees also minimize a potential disruption in the State's water conveyance system.

Opportunities for Multi-Benefit Projects

The main goal of the District during the next five years is to attain a sustainable Bulletin 192-82 levee standard around the entire island. It should be noted that each levee rehabilitation project identified under this Plan can be identified as having multiple objectives. These projects not only lower the flood risk for the lands within the District, but they also lower the risk of impacts to water quality and conveyance, as well as impacts to neighboring islands that are associated with a flood event.

Ecosystem Restoration and Habitat Enhancement

When disturbed, the landside slope will be seeded to propagate a CDFW-approved native grass seed mix. The District will consult with DWR and CDFW on seed selection and best management practices, such as soil preparation, timing of seeding, irrigation, and weed management for achieving the long-term establishment of native grass cover.

Reversing Land Subsidence

The District has previously rehabilitated the majority of the levee system on Holland Tract. The rehabilitated levees included placement of a toe berm, which raised the elevation of the land immediately adjacent to the levee and provided a cap over exposed peat that could otherwise oxidize over time. The berm also minimized any future farming practices immediately adjacent to the levee. The proposed projects involve raising the levee crown and work in select areas on the waterside slope. Limited opportunities exist to reverse land subsidence with the proposed projects, however the District will work to include subsidence reversal measures when feasible.

Ensuring Adequate and Effective Emergency Response Plans

A rehabilitated levee results in a safer, wider levee system than what existed previously. A wider levee enables better access and supports emergency response efforts. It is difficult to respond to emergencies if access is restricted. The most significant constraint to achieving this objective is the ability to secure adequate funding.

Water Quality and Supply Reliability Improvement

Holland Tract is one of the eight western Delta islands. There have been multiple reports and studies that have shown how these islands are critical to the water quality and water supply reliability for the State Water Project and Central Valley Project. Opportunities for improving water quality and supply reliability on Holland Tract are limited; however, improving the existing levees strengthens the system and protects water quality and supply reliability from the potential negative impacts of a levee breach.

Levee Stability and Integrity Improvement

The proposed projects will improve the stability of the levee in the project areas. Armoring the waterside slope of the east levee will protect the slope from erosion. Raising the remainder of

the levee system will increase the freeboard, provide improved flood protection and add protection against seismic failures. Geotechnical recommendations will be incorporated as needed to address site specific issues and promote overall stability.

Actions in the Governor's California Water Action Plan

This Plan is consistent with the relevant actions identified in the governor's California Water Action Plan (2016 Update). The rehabilitation and habitat enhancements proposed contribute toward achieving the co-equal goals for the Delta. Levee rehabilitation and meeting the Bulletin 192-82 Standard enhances flood control while also maintaining water supply reliability. The habitat enhancements contribute toward a healthier ecosystem. This plan is compatible with and supports the actions identified in the California Water Plan.

Section 4. Plan for Permits and Habitat

HABITAT MITIGATION AND ENHANCEMENT

In the early 1990s, the District explored the possibility of mitigating for all impacts that would result from levee maintenance and rehabilitation, both past and future. The goal was to provide a programmatic solution and address the mitigation issues that each project must consider. Reclamation District Nos. 756, 2025, 2026, 2028, 2041, DWR and CDFW (formerly DFG) all participated in a collaborative process to create a mitigation site for the participating districts. On September 20, 1993, a mitigation agreement was executed between CDFW and Reclamation District No. 2041, providing 50 acres of mitigation on Medford Island. Reclamation District No. 2025 was a beneficiary of the agreement. CDFW has subsequently confirmed that all habitat impacts resulting in levee maintenance and rehabilitation that occur within 150 feet of the levee centerline have been previously mitigated for the participating districts under the agreement, with the exception of impacts to Shaded Riverine Aquatic (SRA) habitat.

In 2002, CDFW staff completed a habitat assessment of the levee system (Appendix D, Holland Tract Reclamation District No. 2025 Levee Habitat Assessment). The habitat assessment describes the wildlife habitat and vegetation resources observed along the levee system.

No habitat mitigation requirements are anticipated for the landside work proposed in this Plan. The proposed projects will be designed to avoid impacts to SRA habitat; therefore, no mitigation is anticipated at this time.

PRE-EXISTING HABITAT CONDITIONS

The Levee Habitat Assessment (LHA) identifies a total of 24.4 acres of on-island habitat; of that 24.4 acres, 11.6 acres of scrub-shrub (mostly Himalaya blackberry), 6.9 acres of riparian forest (mostly willow, but also includes cottonwood, walnut and elm) and 5.9 acres of freshwater marsh (mostly tule, but also includes common reed, and cattails). There are 1,117 lineal feet of shaded riverine aquatic habitat.

ANTICIPATED IMPACT AND OPPORTUNITIES FOR AVOIDANCE OF HABITAT IMPACT

Since most of the island was recently rehabilitated, impacts are expected to be minimal. Phase 1 will avoid any SRA habitat on the waterside slope. Vegetation will be removed on the upper landside slope during Phase 2 and is premitigated. Phase 3 only includes work on the levee crown. The District is pre-mitigated out to 150' from the levee centerline on the landside of the levee for impacts to riparian forest, scrub shrub, and freshwater marsh through the 1994 Mitigation Agreement between Reclamation District 2041 (Medford Island) and CDFW. The District will work with CDFW and other regulatory agencies as appropriate to assess impacts from construction.

In compliance with Water Code Section 12314, the District will minimize its impact on the project areas. The following measures are proposed for implementation as part of the levee rehabilitation activities to help conserve and minimize impacts to vegetation and wildlife.

- The project will be restricted to the proposed levee footprint.
- No work will be performed below mean high water on the waterside of the levee.
- Anticipated impacts will be to grasses, ruderal weeds, and a small number of trees and shrubs. Tree and shrub removal will be on the landside only and has been pre-mitigated, resulting in no net loss of habitat.
- The land adjacent to the levee is primarily agricultural land, and the proposed habitat enhancements provide a net habitat improvement.

If necessary, the District will request to be included in a State-sponsored program to meet the requirement of no net long-term loss of habitat and a net habitat improvement.

Potential On-site Habitat Mitigation Opportunities

Mitigation opportunities within the levee footprint are somewhat limited, however opportunities may exist elsewhere on the island. Since little to no mitigation is anticipated to be required for the proposed projects, there has been little focus on identifying opportunities. However, the District is open to exploring opportunities that may potentially benefit Delta interests.

Potential On-site Ecosystem Enhancement Opportunities

Ecosystem enhancement opportunities may exist along the levee and within the interior of the island. The District has proposed ecosystem enhancements where feasible, including seeding the landside slopes with native grasses. The District is open to exploring opportunities that may potentially benefit both the District and Delta interests.

Compliance with CEQA and Required Permit Procurement

Required Permits and Environmental Compliance Documents

The work described in this plan will generally take place along the landside and crown of the levee within the existing levee footprint and is considered rehabilitation of an existing serviceable structure. It is anticipated that a Streambed Alteration Agreement will be required to armor the east levee and newly placed crown fill on the water side of the south levee. The existing riprap will be compacted to create a bench that will support the new riprap and prevent material from entering the water. Section 401 and 404 permits should not be necessary as work will be conducted above the ordinary high-water mark (OHWM) and the levee does not exhibit wetland characteristics. No additional permits are anticipated to be necessary. The District intends to work with DWR and CDFW in a collaborative fashion regarding its CEQA documentation and permit requirements for projects that are funded by a project funding agreement.

Environmental Documentation, Permit Status, and Meeting Agency Requirements

It is anticipated that the environmental documentation required will generally consist of a CEQA

Mitigated Negative Declaration for the bulk of the work associated with this plan. Environmental documentation will be reviewed by the District's attorney and environmental consultants to determine whether the proposed documentation satisfies the legal requirements that exist at the time. If any additional permits are required, the District will coordinate with the appropriate agencies and will obtain the necessary permits prior to construction. The District will act as the Lead Agency under CEQA and DWR will be a Responsible Agency for the projects it provides funding for.
Once the proposed projects have been constructed, the District has a Routine Maintenance Agreement (RMA) with CDFW. The RMA covers many aspects of the District's maintenance responsibilities, and allows for various types of trimming, pruning, clearing, and is dependent upon multiple factors, including time of year. The RMA also allows for small erosion repair at sites that will not place rock or fill in the water. This RMA was developed through arbitration as described in the CDFW code and complies with CEQA's Categorical Exemption requirements and the no net loss of habitat requirements of the Delta Levees Program.

When a project may impact an environmental resource, the determination will be made without reference or reliance upon mitigation measures. Mitigation measures involve an evaluative process weighted against potential environmental impacts through standard CEQA procedures for an EIR or negative declaration.

Projects filing as Categorical Exemptions will provide justification, as part of the draft SOW, that there are no exceptions to the exemption they intend to work under (Article 19 Categorical Exemptions: Section 15300.2 Exceptions).

Projects filing as an IS/MND will provide the Initial Study for review as part of the draft SOW and before filing the MND.

REFERENCES

California Department of Fish and Game, 2002, Holland Tract Reclamation District No. 2025 Levee Habitat Assessment: prepared for Reclamation District No. 2025, Holland Tract.

California Department of Public Works, 1930, Bulletin No. 37, Irrigation, Reclamation and other Public Districts in California, Division of Water Resources.

Camp, Dresser & McKee Inc, 1992, Ability to Pay Study: prepared for the California Department of Water Resources.

Hultgren-Tillis Engineers, 2008, *Geotechnical Investigation: Holland Tract. Stations 55 to 250*: prepared for Reclamation District No. 2025, Holland Tract.

Hultgren-Tillis Engineers, 2008, *Geotechnical Investigation: Holland Tract. Stations 545 to 579 and 0 to 55*: prepared for Reclamation District No. 2025, Holland Tract.

Hultgren-Tillis Engineers, 2009, *Geotechnical Investigation: Holland Tract. Stations 250 to 440*: prepared for Reclamation District No. 2025, Holland Tract.

Hultgren-Tillis Engineers, 2010, *Borrow Site Investigation: Holland Tract*: prepared for Reclamation District No. 2025, Holland Tract.

Jones & Stokes, 2001, *Final Environmental Impact Statement, Delta Wetlands Project - Volume I:* prepared for the U.S. Army Corps of Engineers Sacramento District.

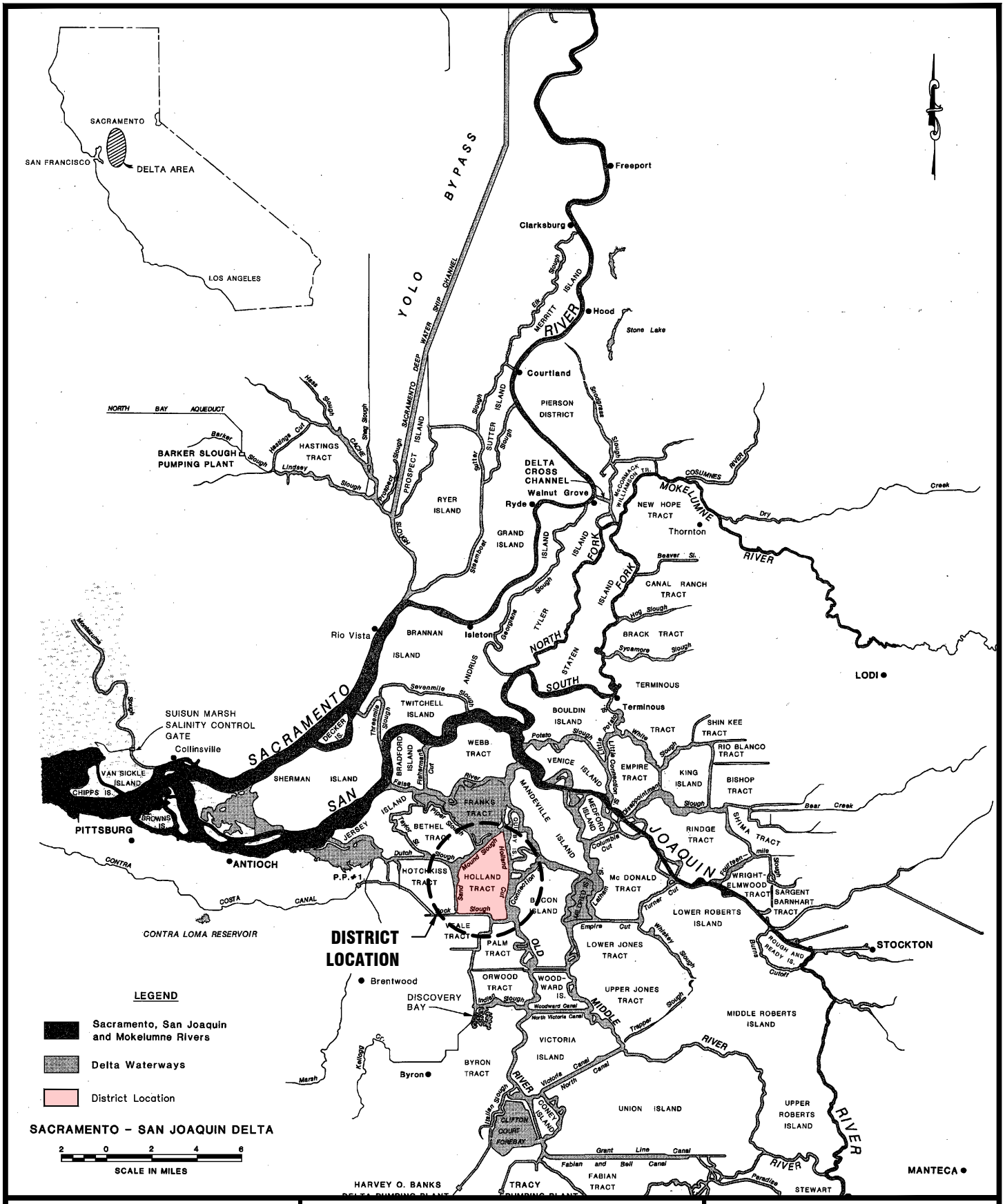
Thompson, John, 1957, The Settlement Geography of the Sacramento-San Joaquin Delta, California: Doctor of Philosophy, Geography Dissertation from Stanford University.

URS Corporation and J.R. Benjamin & Associates, Inc., 2007, Technical Memorandum: Delta Risk Management Strategy (DRWS) Phase 1 Draft Risk Analysis: prepared for the California Department of Water Resources.

TABLE 6. TABLE OF REQUIRED TABULATED INFORMATION

Required Information	Value/Units	Discussion
Total acreage protected by Local Agency levees	4,294 acres	
Total levee miles maintained by Local Agency	10.96 miles	
Levee miles in the Local Agency service area that are not maintained through the Delta Levee Program (e.g. Dry levees, cross levees)	0	
Percentage of Local Agency's levee system at or above HMP Levee Standard	100%	
Miles of Local Agency's levee system raised to meet the minimum HMP Standard through the Delta Levees Special Projects Program	6.71	
Percentage of Local Agency's levee system at or above Bulletin 192-82 Levee Standard	66%	
Miles of Local Agency's levee system raised to meet the Bulletin 192-82 Levee Standard through the Delta Levees Special Projects Program	66%	
Number of levee rehabilitation projects funded through the Delta Levees Special Projects Program for the Local Agency	5	
Total State funds expended for levee rehabilitation projects on the Local Agency's Island/Tract through the Delta Levees Special Projects Program	$10,138,550	
List of local and non-local assets and critical infrastructure protected by the Local Agency's levee system		• Agricultural operations and structures • 2 marinas • County road • Barge access to Quimby Island • Drainage and irrigation infrastructure • One of the 8 western Delta islands • Adjacent to water conveyance corridors

Appendix A – Maps and Exhibits



MBK ENGINEERS 455 University Avenue, Suite 100 Sacramento, California 95825 Phone: (916) 456-4400 • Fax: (916) 456-0253	**RECLAMATION DISTRICT NO. 2025** **HOLLAND TRACT** **VICINITY MAP**

SCALE:	AS NOTED
JOB NUMBER:	4275-18
DRAWN BY:	JB
DATE:	09/17/2020
SHEET:	1 OF 9

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RECLAMATION DISTRICT NO. 2025
HOLLAND TRACT

AERIAL MAP WITH STATIONING

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JOB NUMBER:	4275-18
DRAWN BY:	JB
DATE:	09/17/2020
SHEET:	2 OF 9

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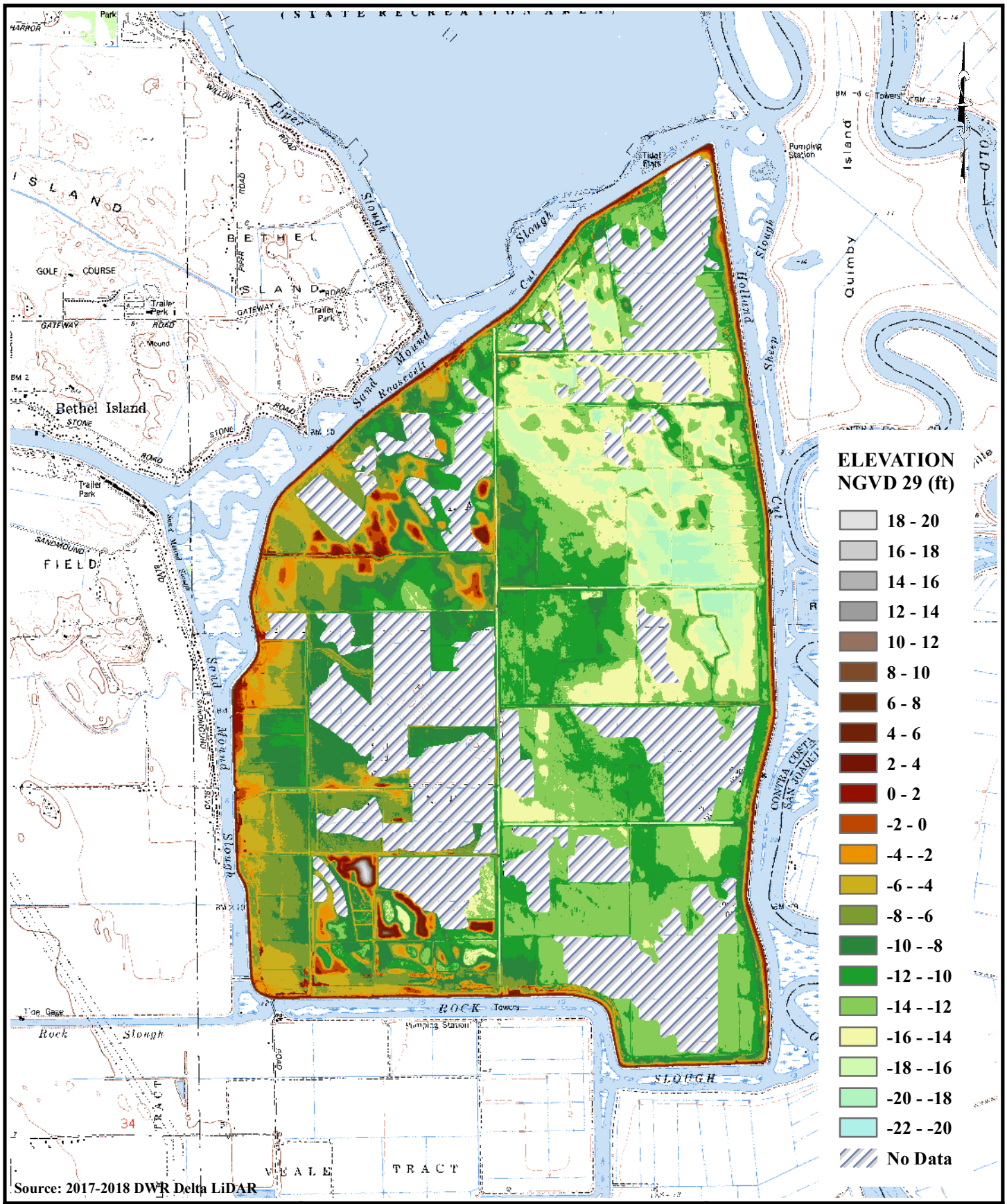

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RECLAMATION DISTRICT NO. 2025
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DISTRICT ELEVATION EXHIBIT

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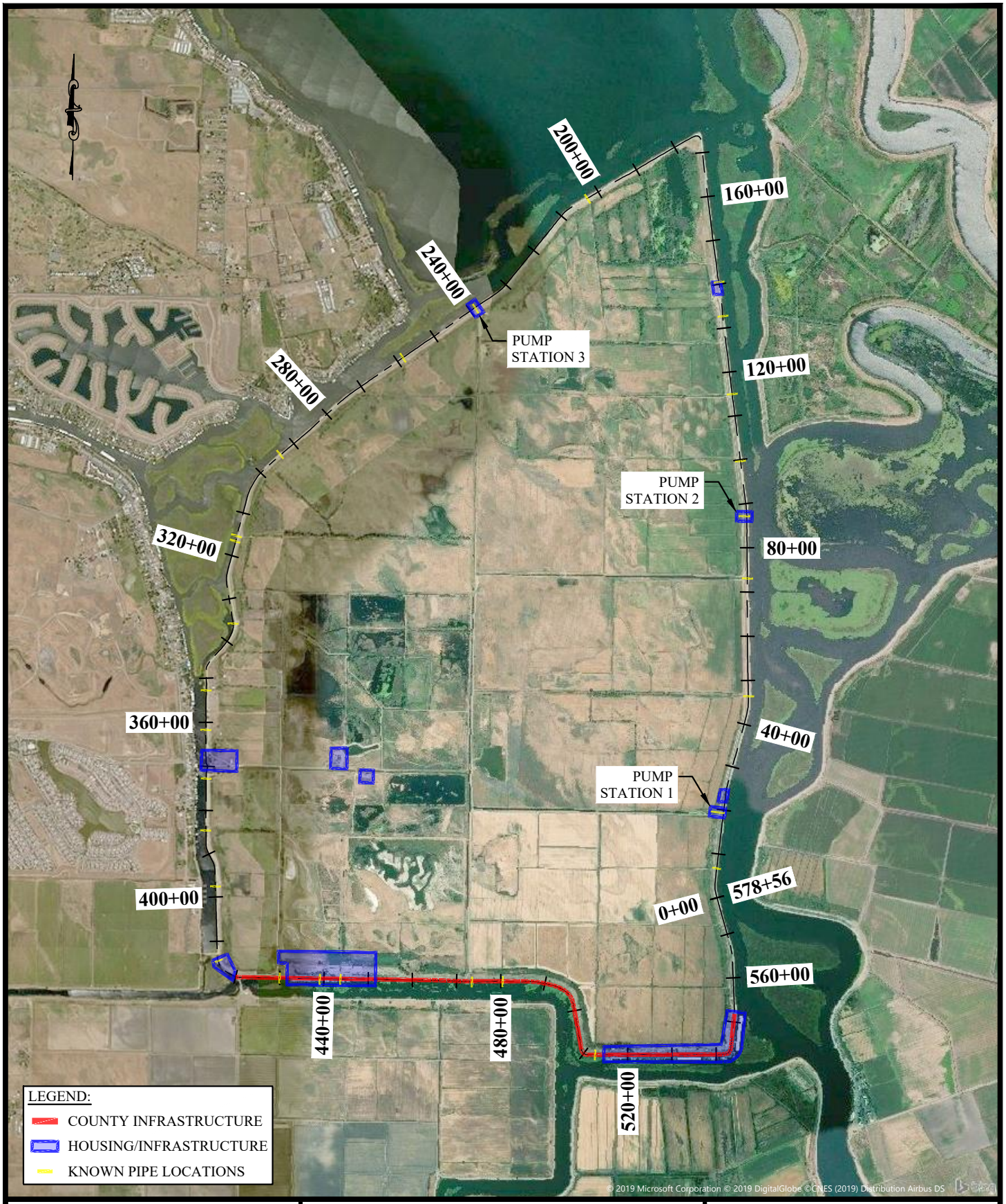

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RECLAMATION DISTRICT NO. 2025
HOLLAND TRACT

DISTRICT INFRASTRUCTURE MAP

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DRAWN BY:	JB
DATE:	09/17/2020
SHEET:	4 OF 9

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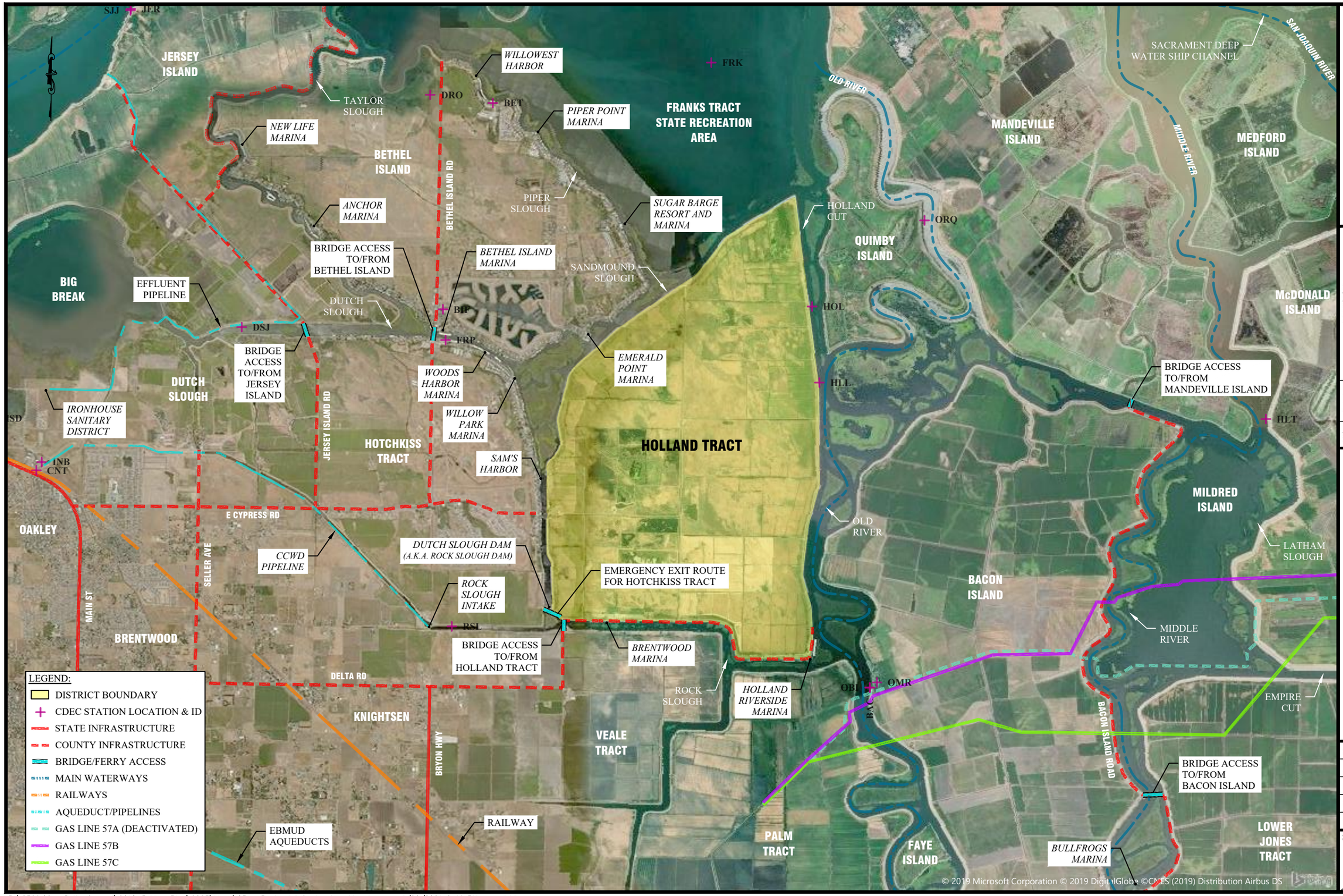

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NO.	DATE	REVISION

RECLAMATION DISTRICT NO. 2025
HOLLAND TRACT

REGIONAL INFRASTRUCTURE MAP

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BY:	JB
CHK:	NH
DATE:	04/23/2020

SHEET 5 OF 9 SHEETS

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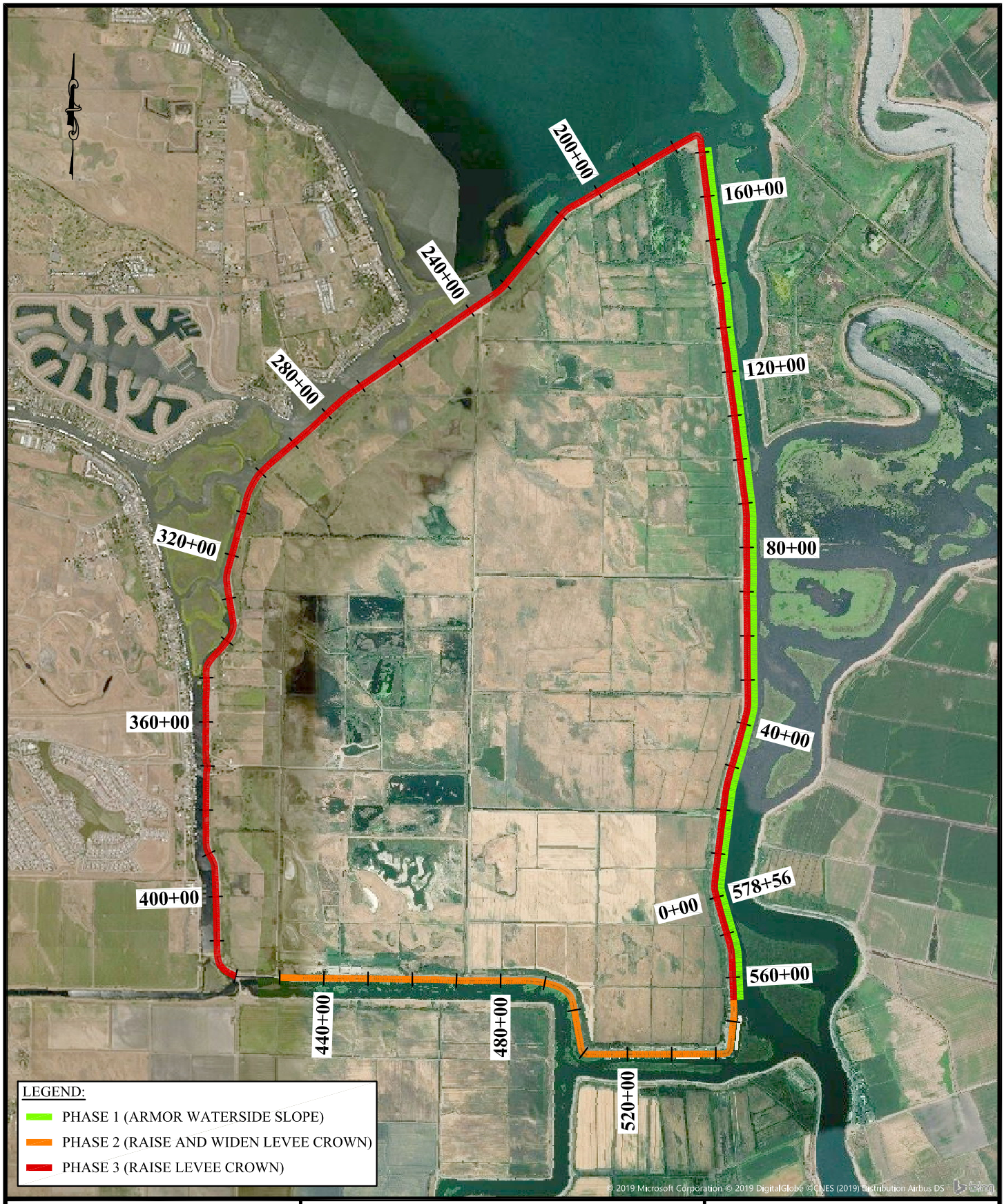

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RECLAMATION DISTRICT NO. 2025
HOLLAND TRACT

PROJECT PHASING EXHIBIT

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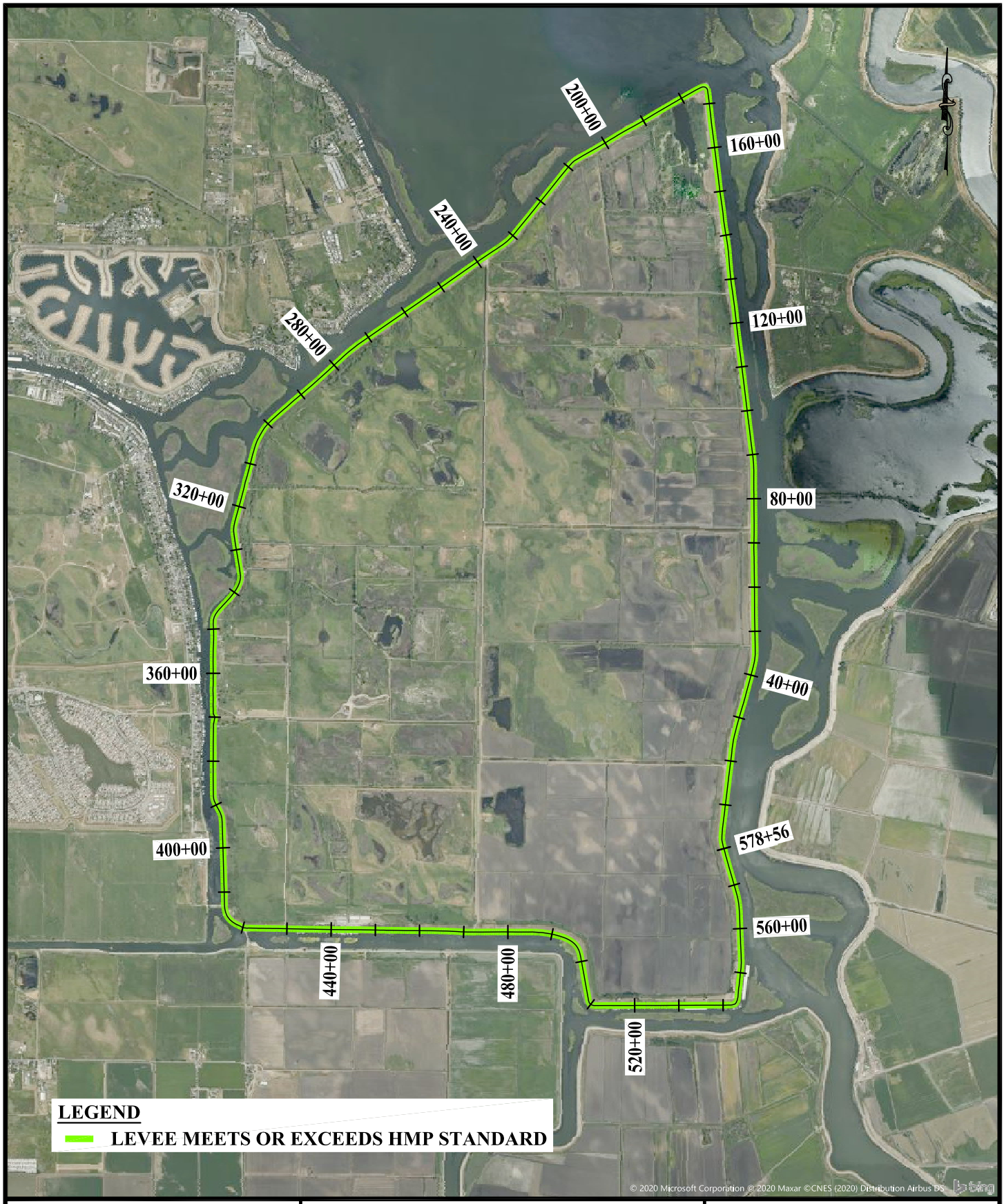

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DELTA LEVEE STANDARD STATUS - HMP

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DRAWN BY:	AR
DATE:	09/16/2020
SHEET:	7 OF 9

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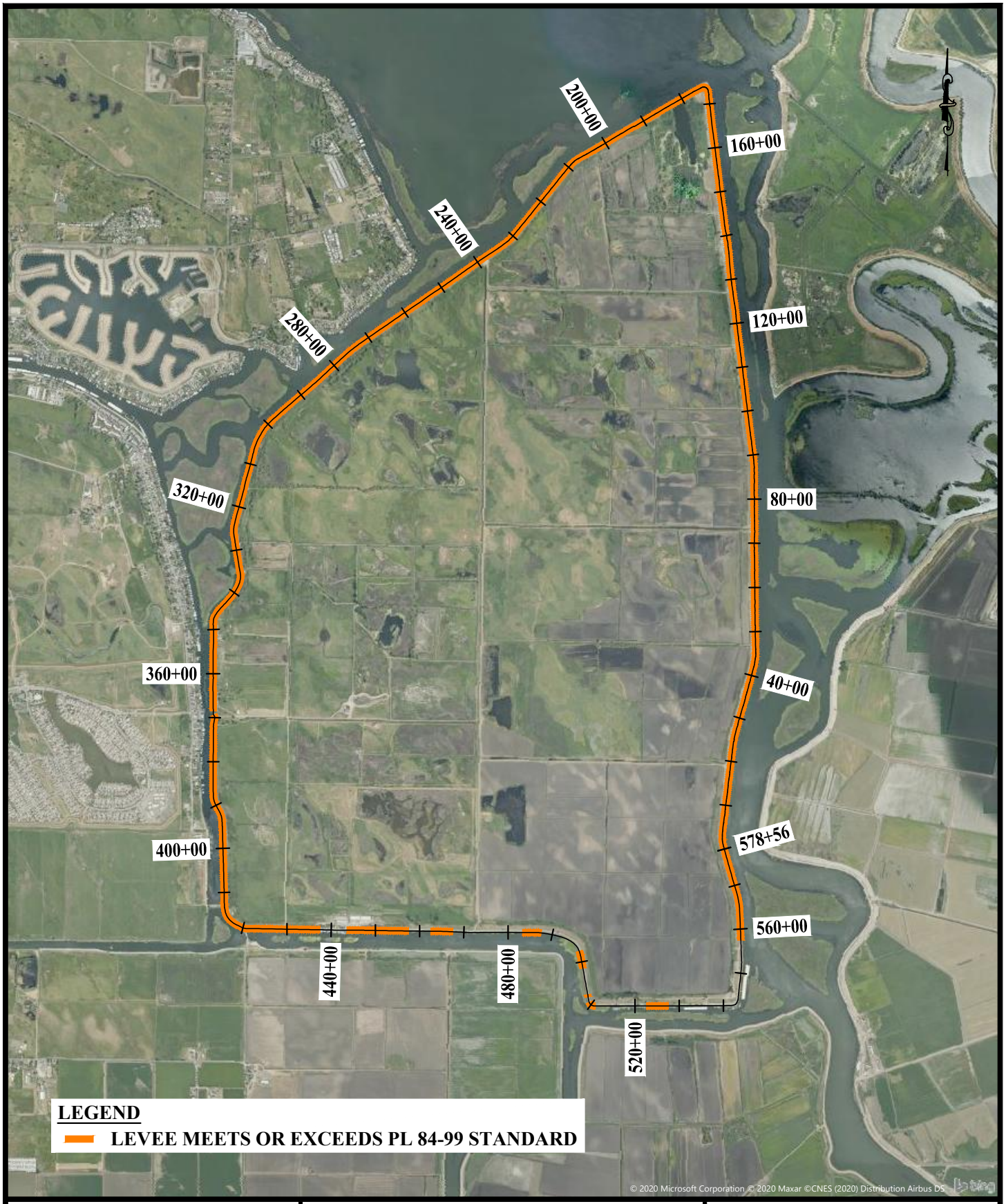

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RECLAMATION DISTRICT NO. 2025
HOLLAND TRACT

DELTA LEVEE STANDARD STATUS - PL 84-99

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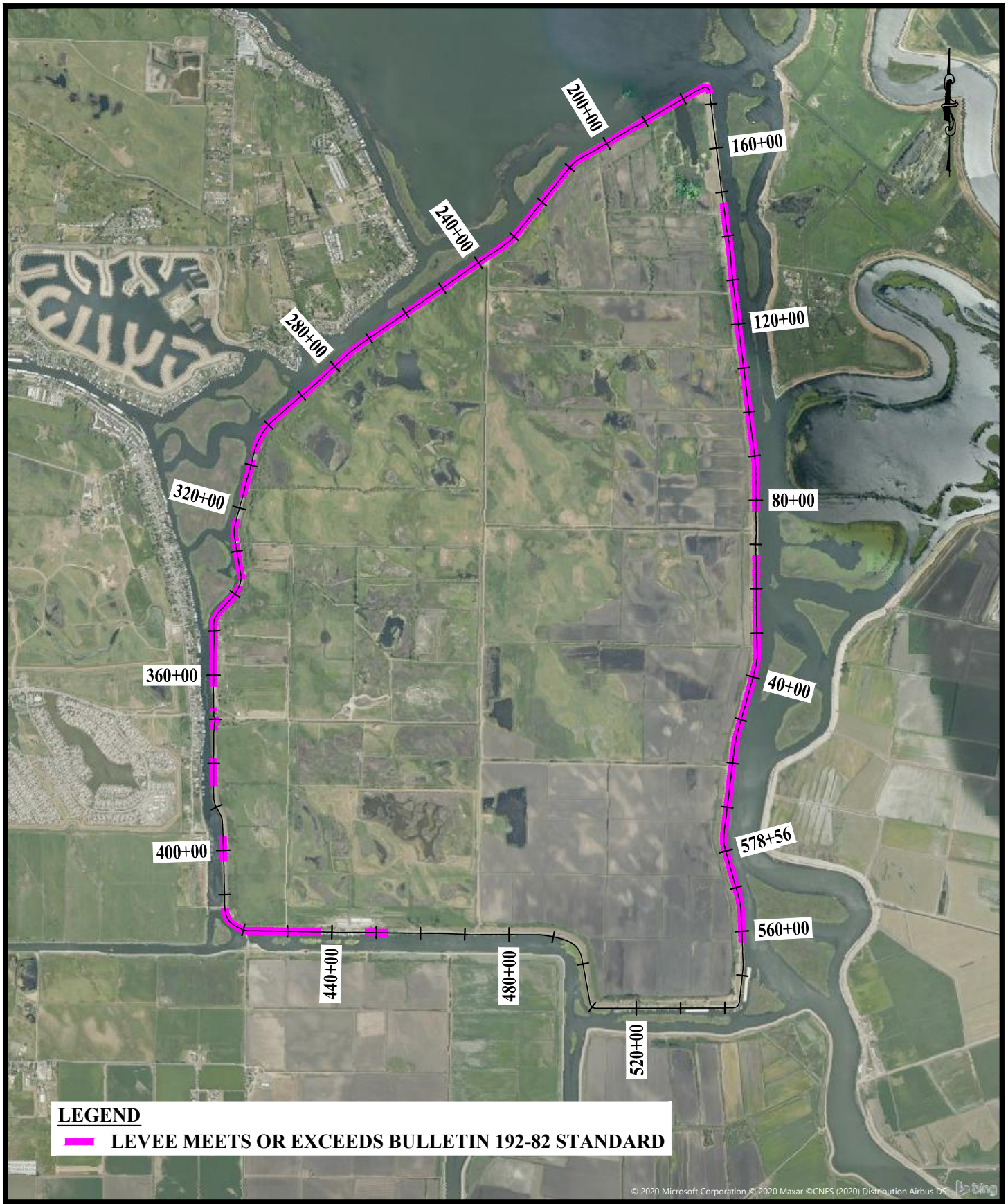

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RECLAMATION DISTRICT NO. 2025
HOLLAND TRACT

DELTA LEVEE STANDARD STATUS - BULLETIN 192-82

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DRAWN BY:	AR
DATE:	09/16/2020
SHEET:	9 OF 9

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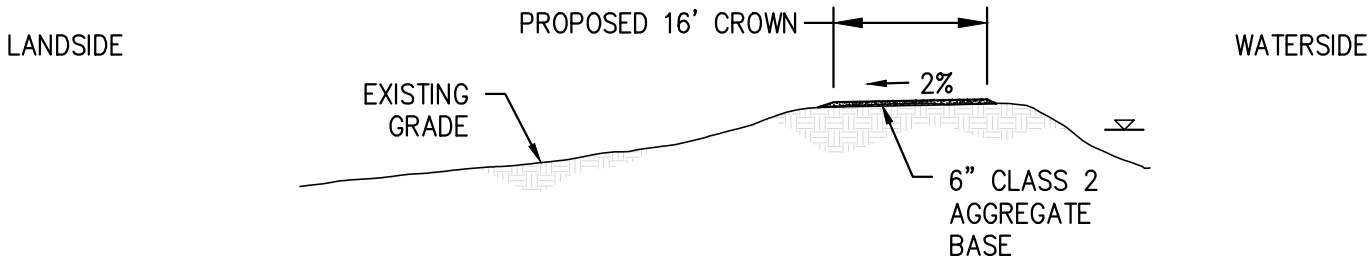
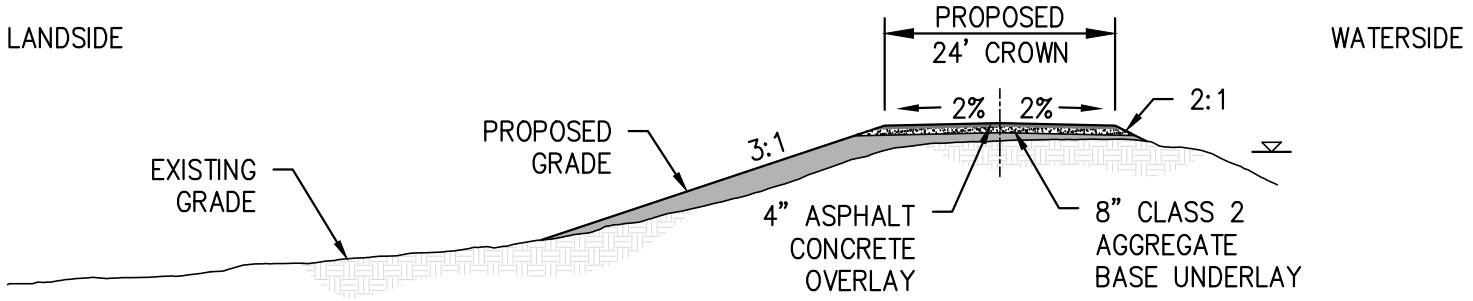
Appendix B – Typical Cross Sections, Levee Profiles, and Cross Sections



TYPICAL 16' AB ROADWAY

BULLETIN 192-82, 16' CROWN : STATIONS 0+00 TO 420+00



TYPICAL 24' AC CROWN ROADWAY WITH BULLETIN 192+82 SIDE SLOPES

BULLETIN 192-82 +1', 24' AC CROWN : STATIONS 430+00 TO 555+00

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RECLAMATION DISTRICT NO. 2025
HOLLAND TRACT

TYPICAL CROSS SECTIONS

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DRAWN BY:	JB
DATE:	09/17/2020
SHEET:	1 OF 4

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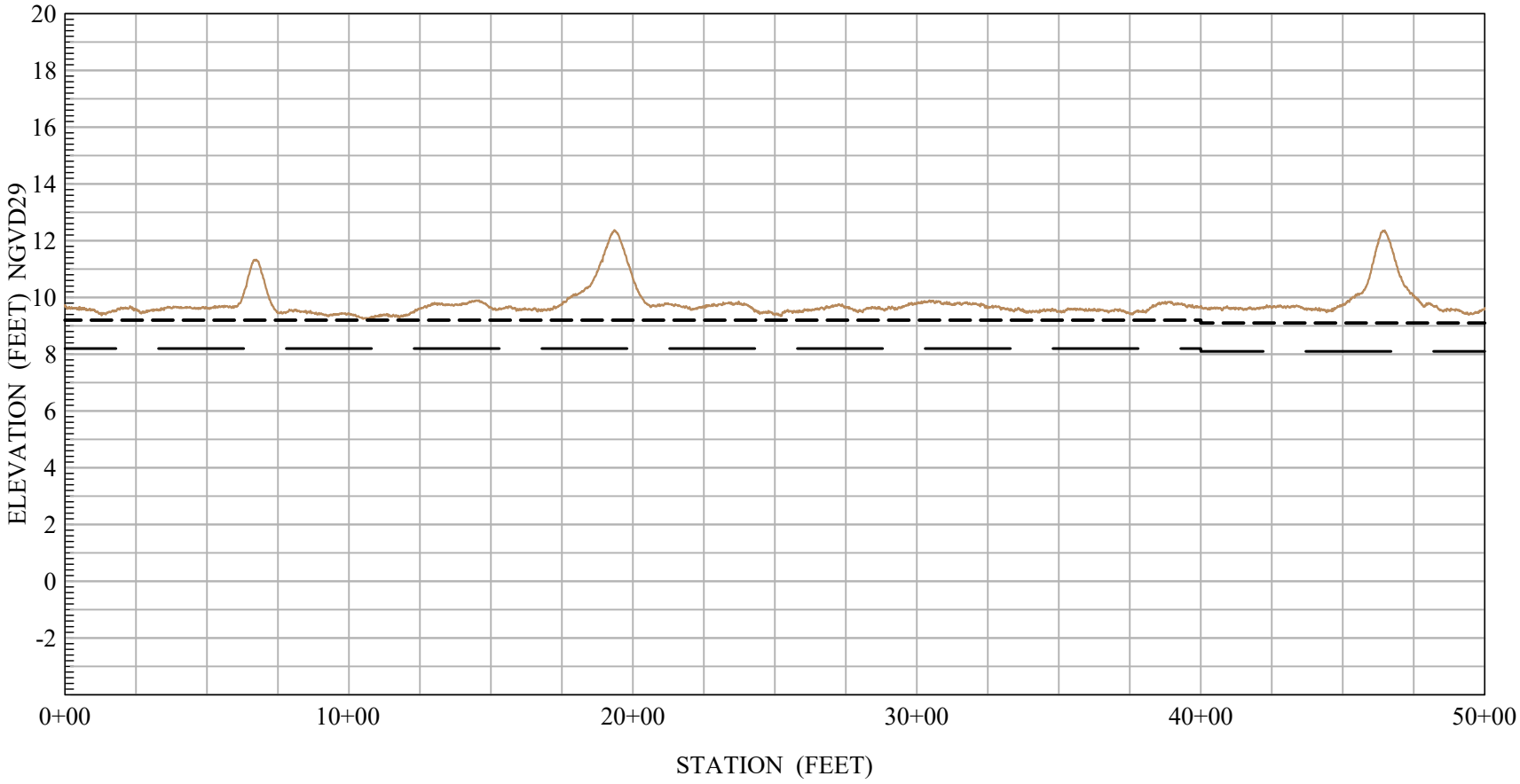
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 0+00 - 50+00



PROFILE SHEET: 1 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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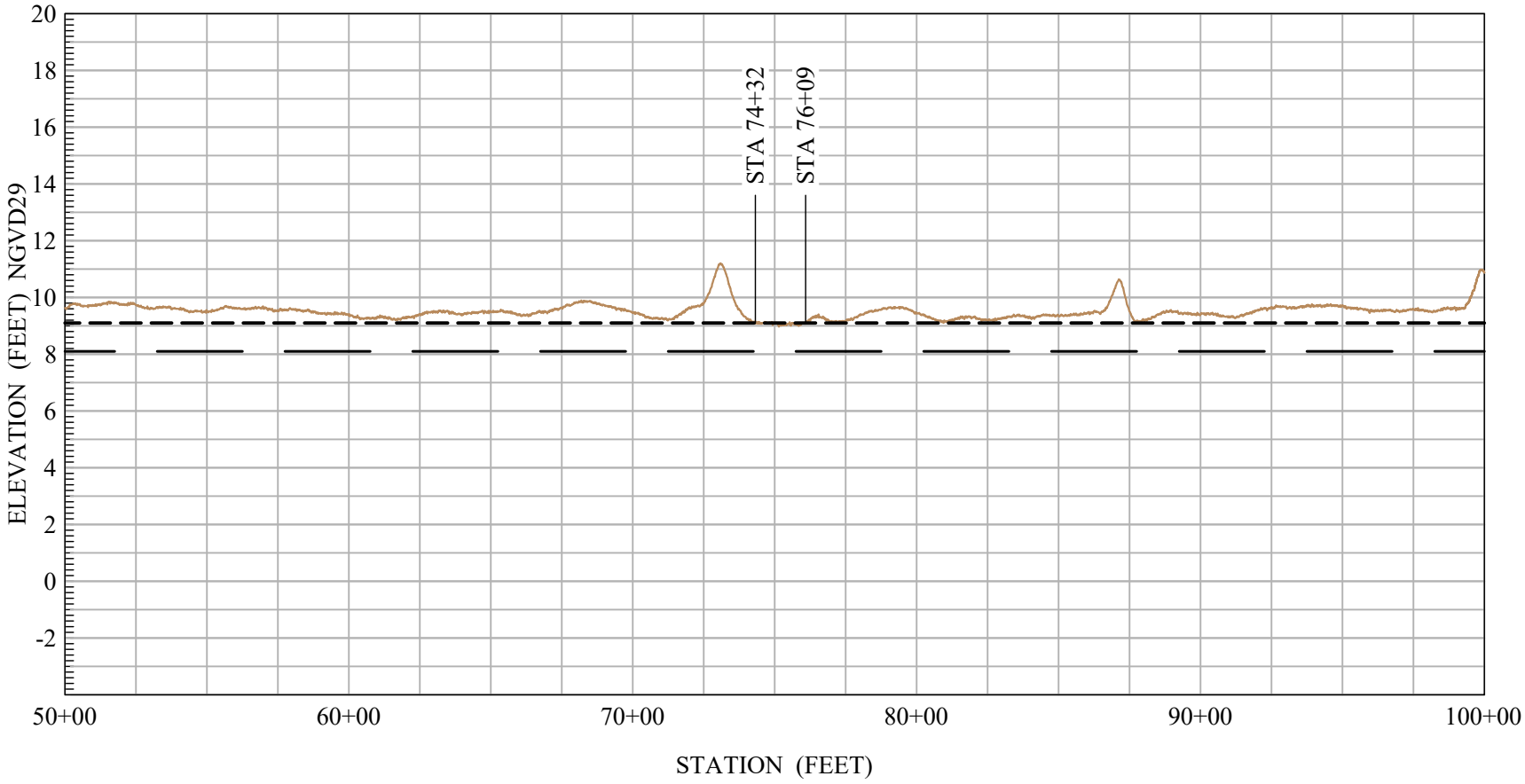
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 50+00 - 100+00



PROFILE SHEET: 2 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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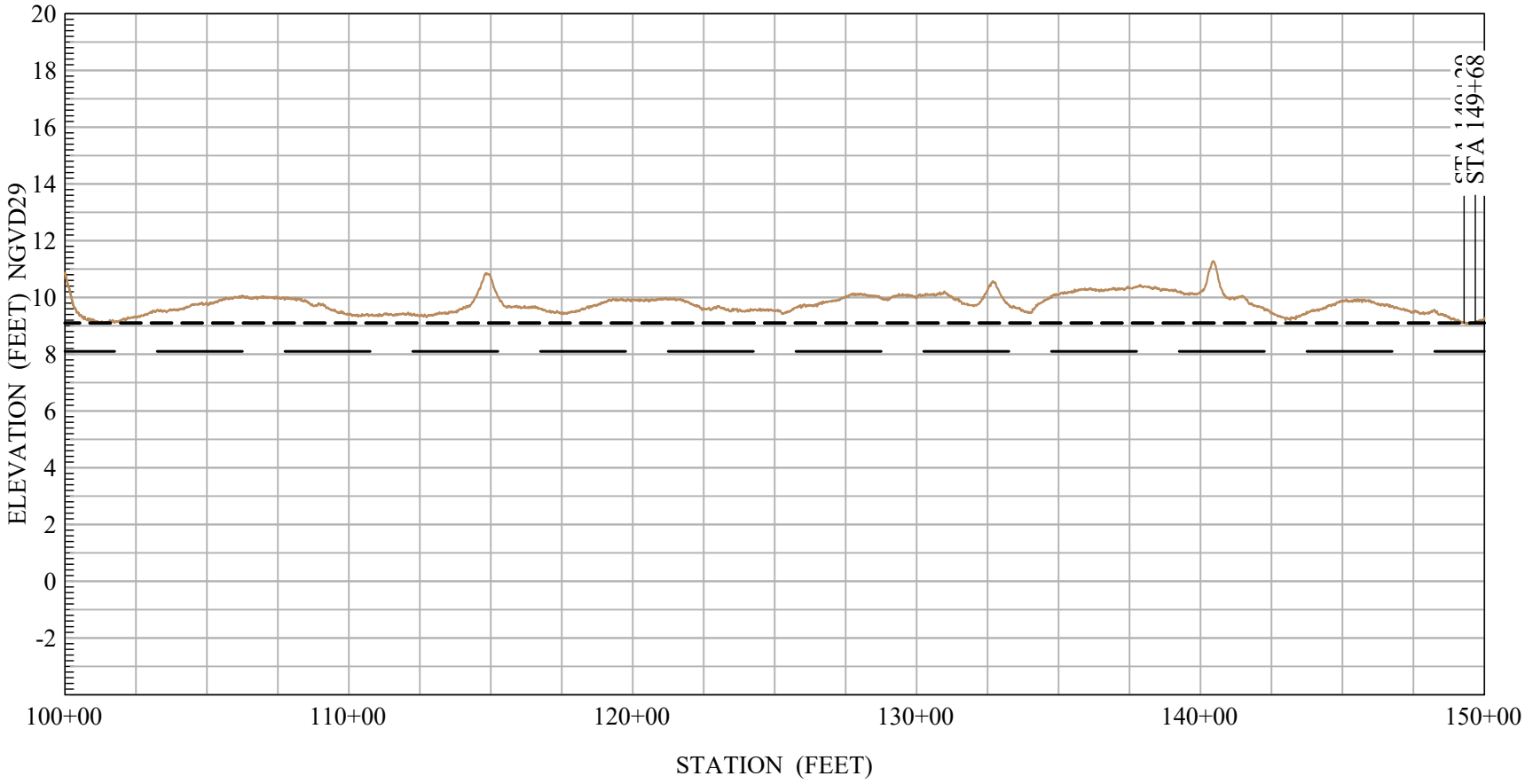
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 100+00 - 150+00



PROFILE SHEET: 3 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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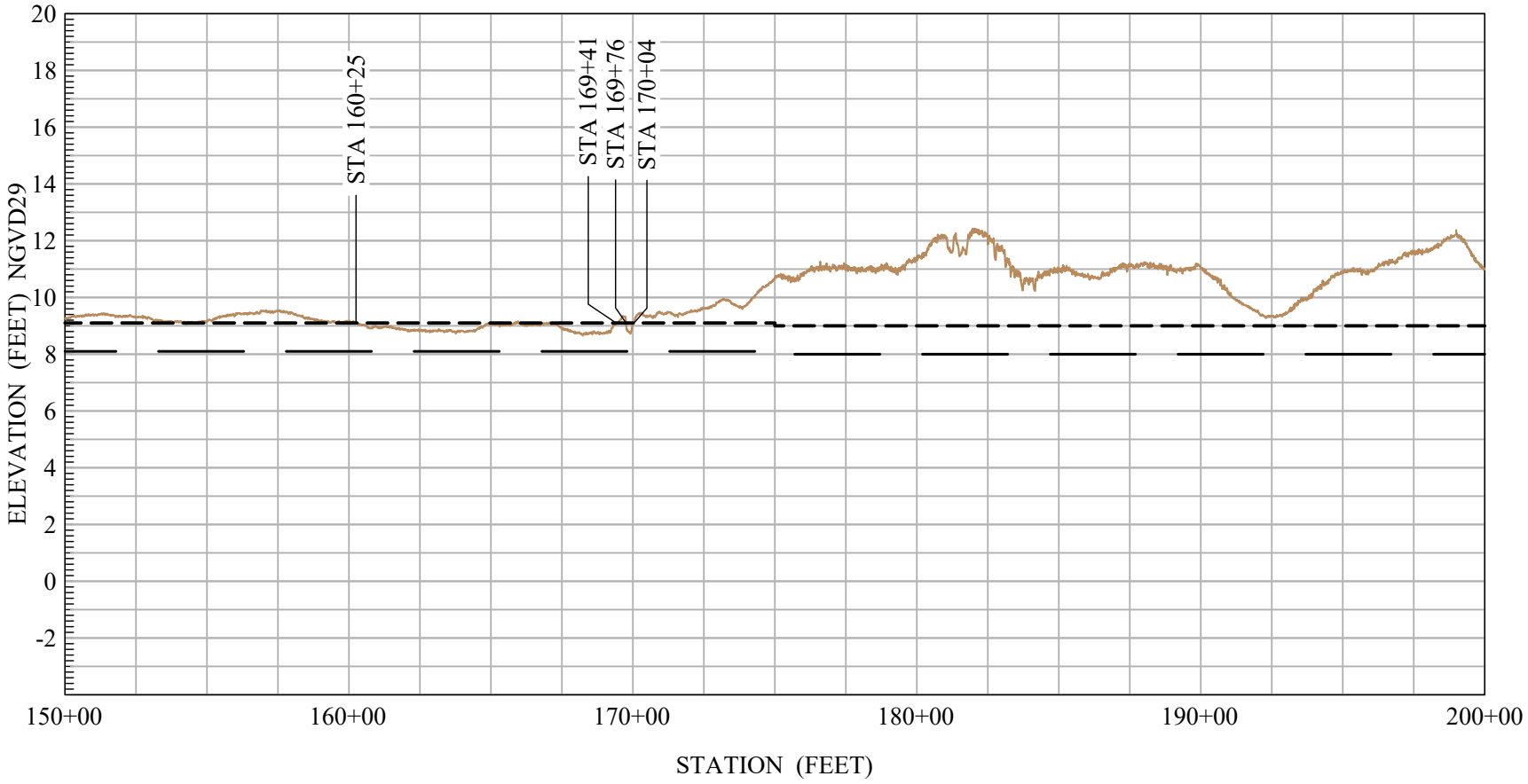
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 150+00 - 200+00



PROFILE SHEET: 4 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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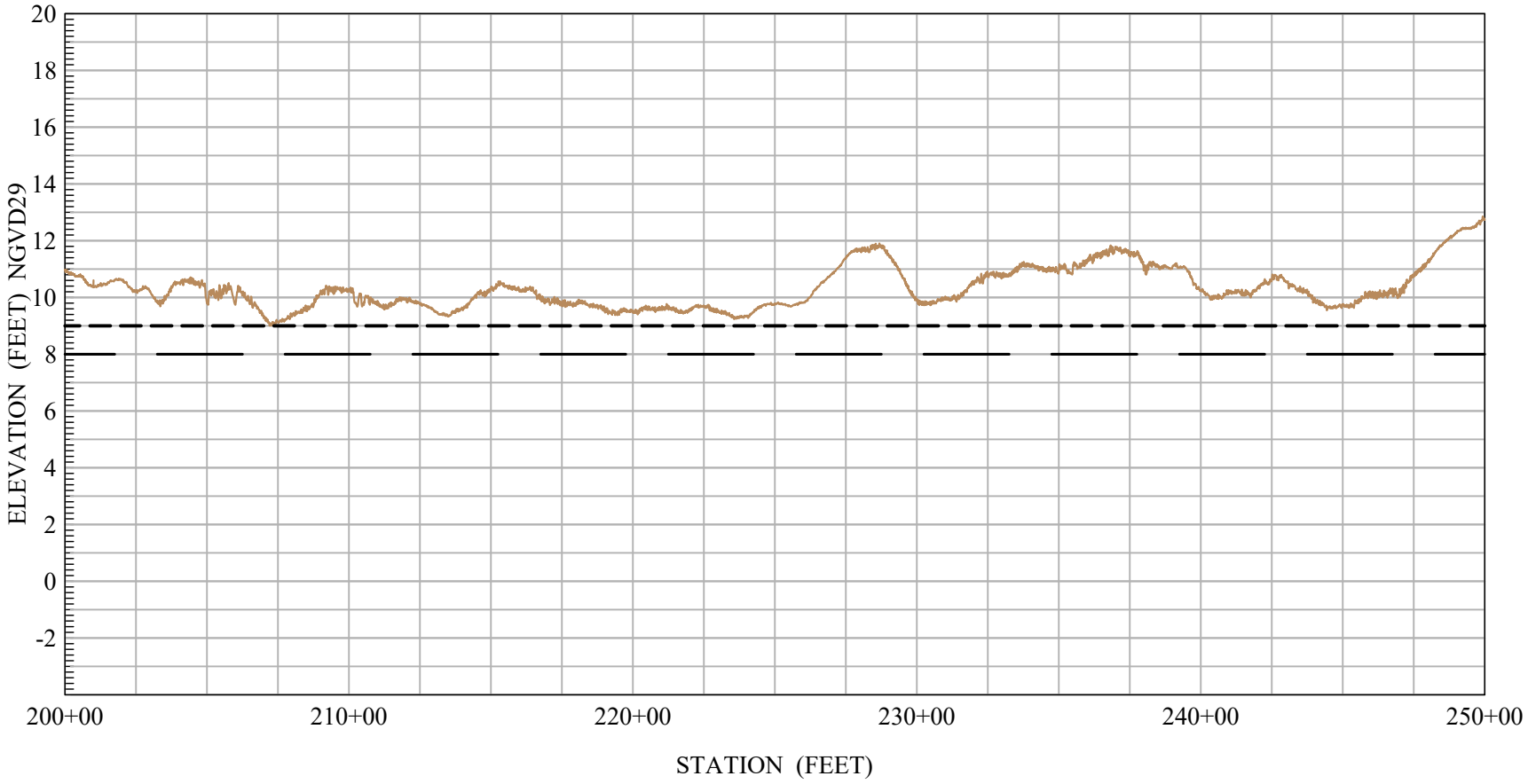
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 200+00 - 250+00



PROFILE SHEET: 5 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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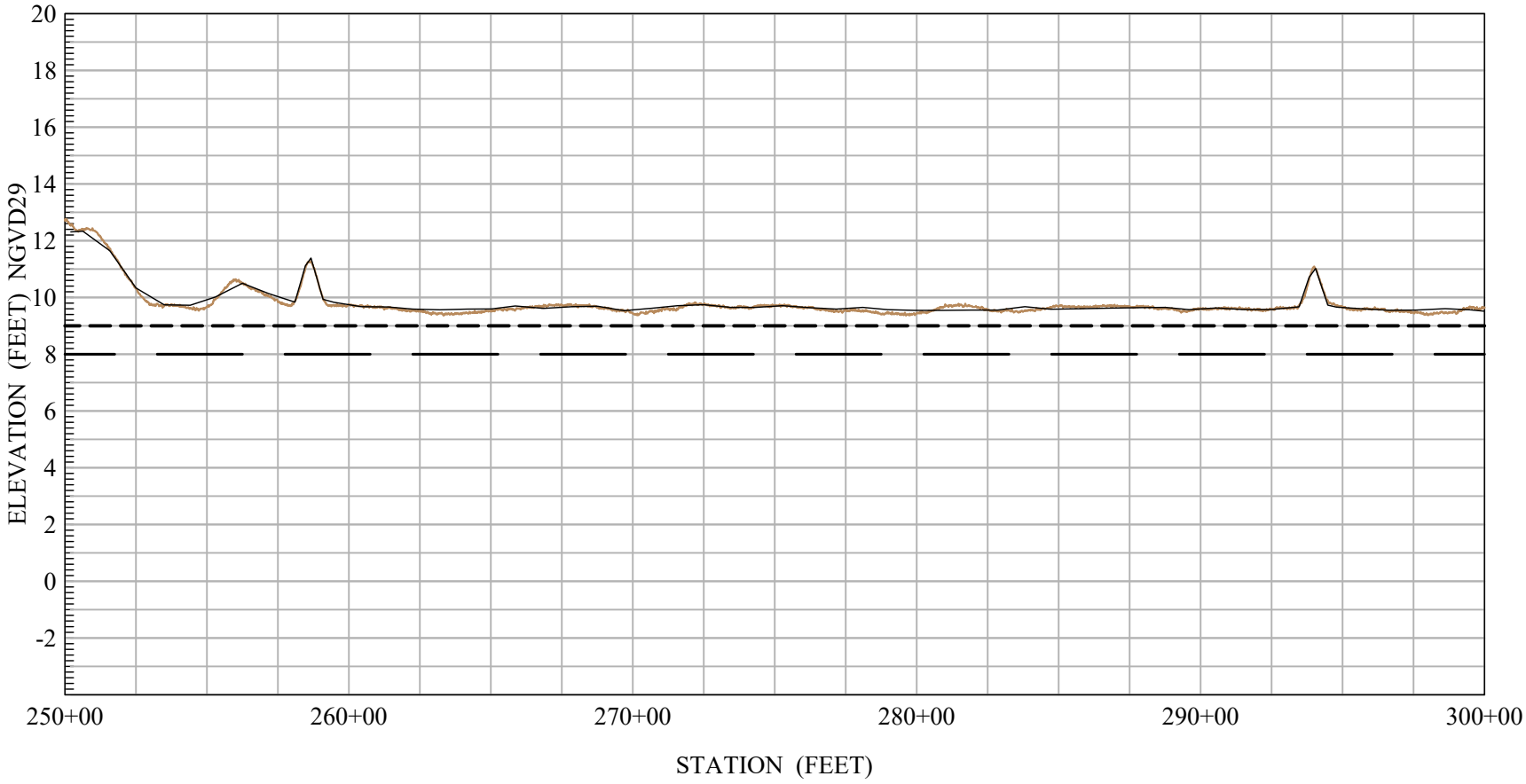
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 250+00 - 300+00



PROFILE SHEET: 6 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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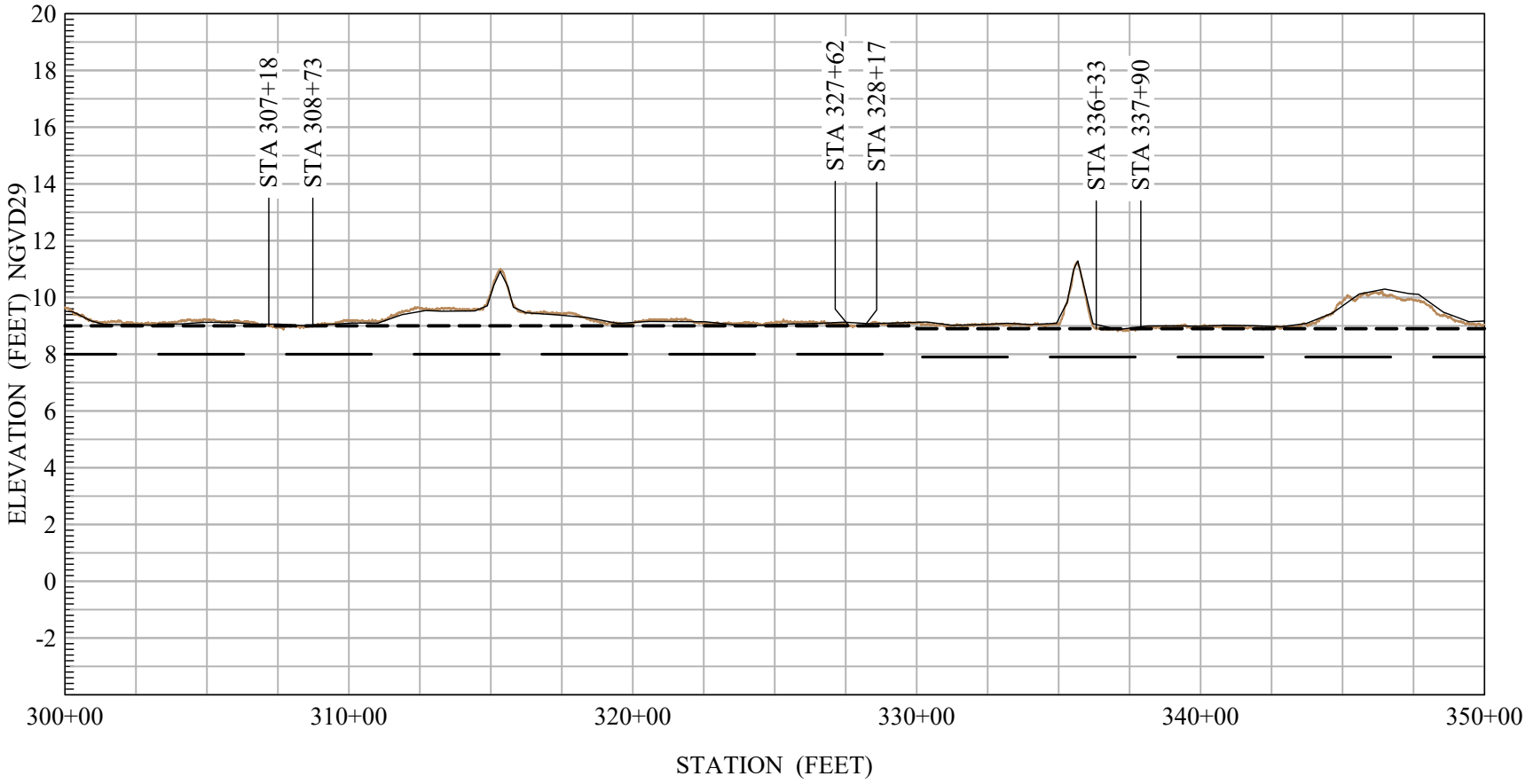
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 300+00 - 350+00



PROFILE SHEET: 7 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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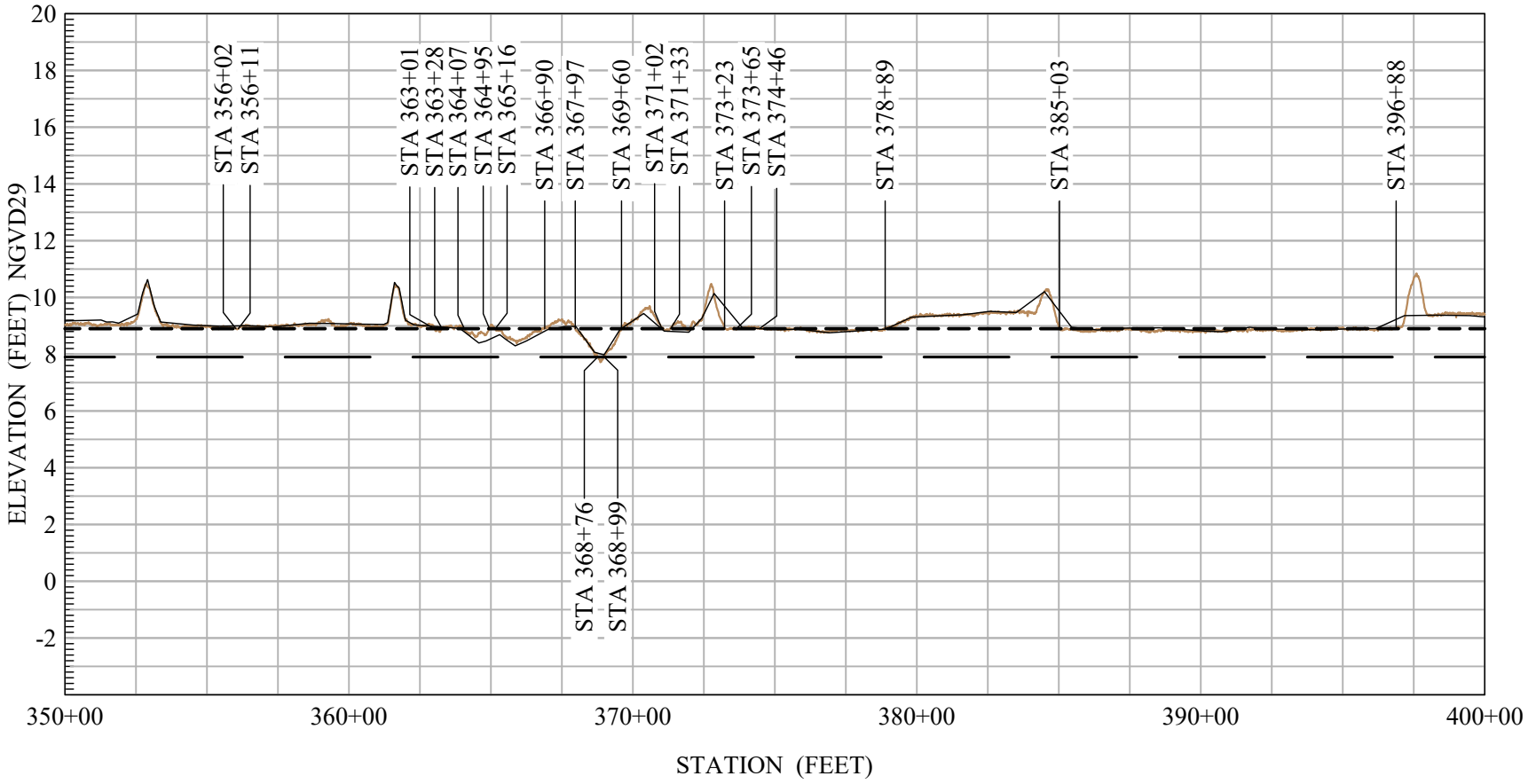
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 350+00 - 400+00



PROFILE SHEET: 8 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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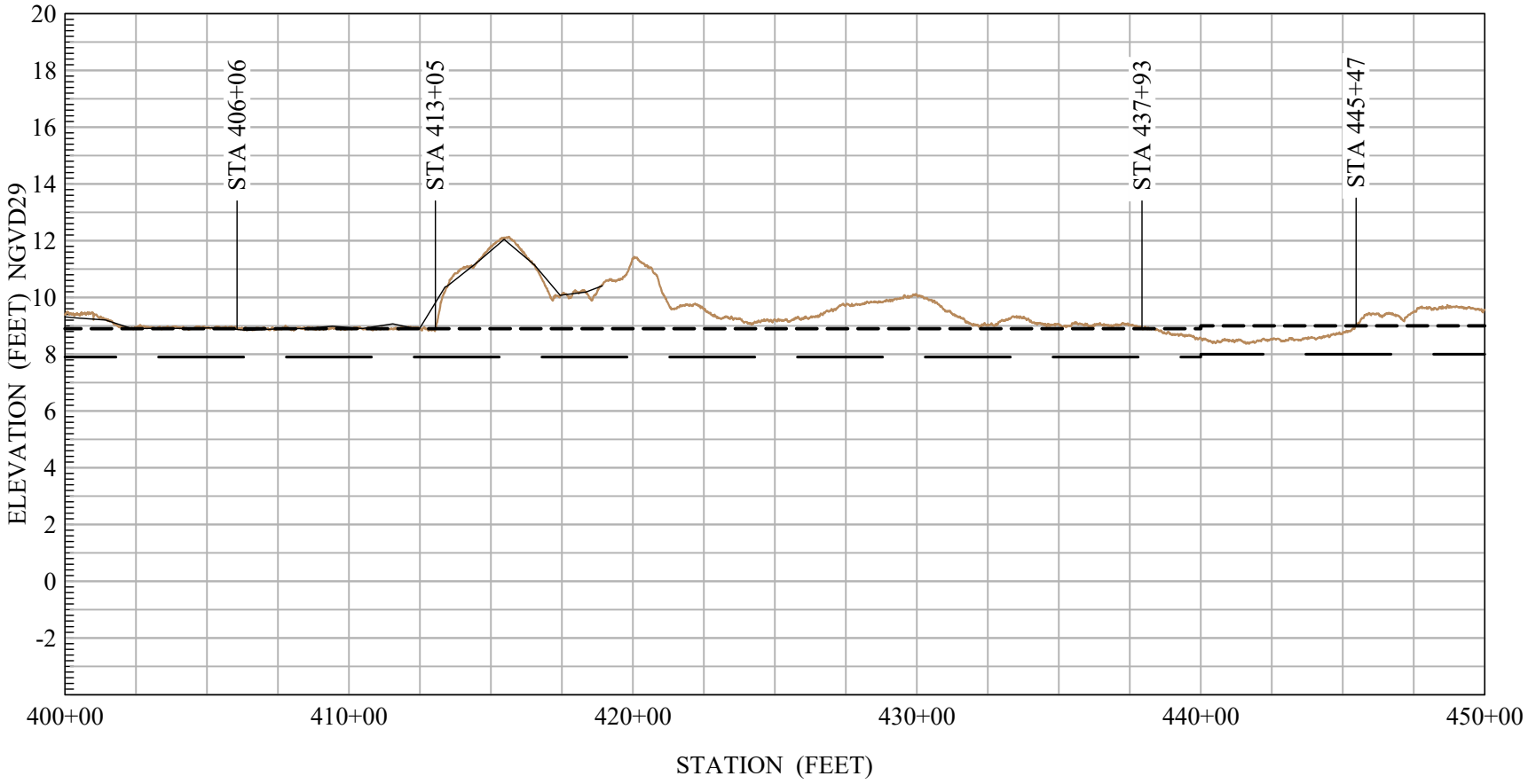
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 400+00 - 450+00



PROFILE SHEET: 9 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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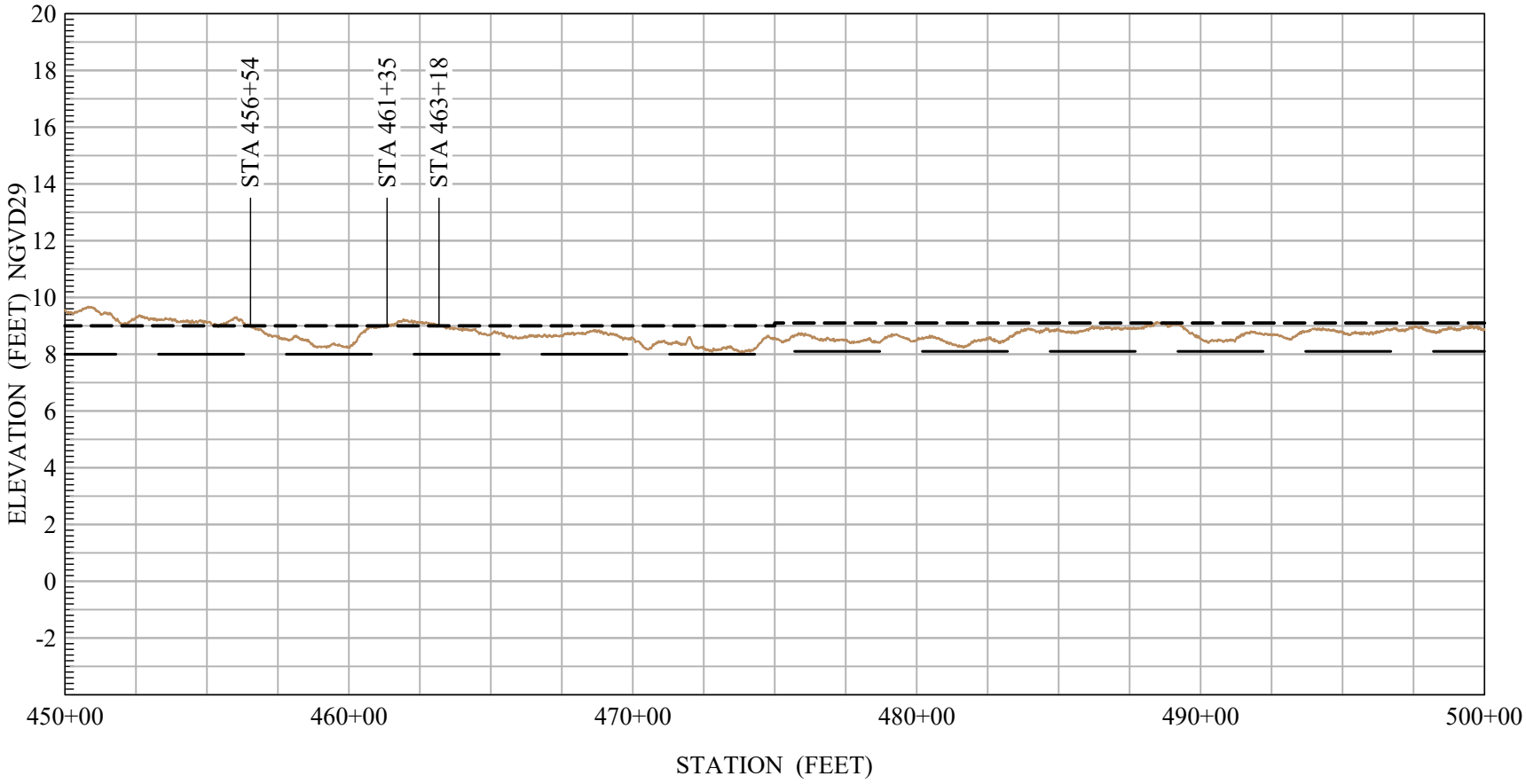
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 450+00 - 500+00



PROFILE SHEET: 10 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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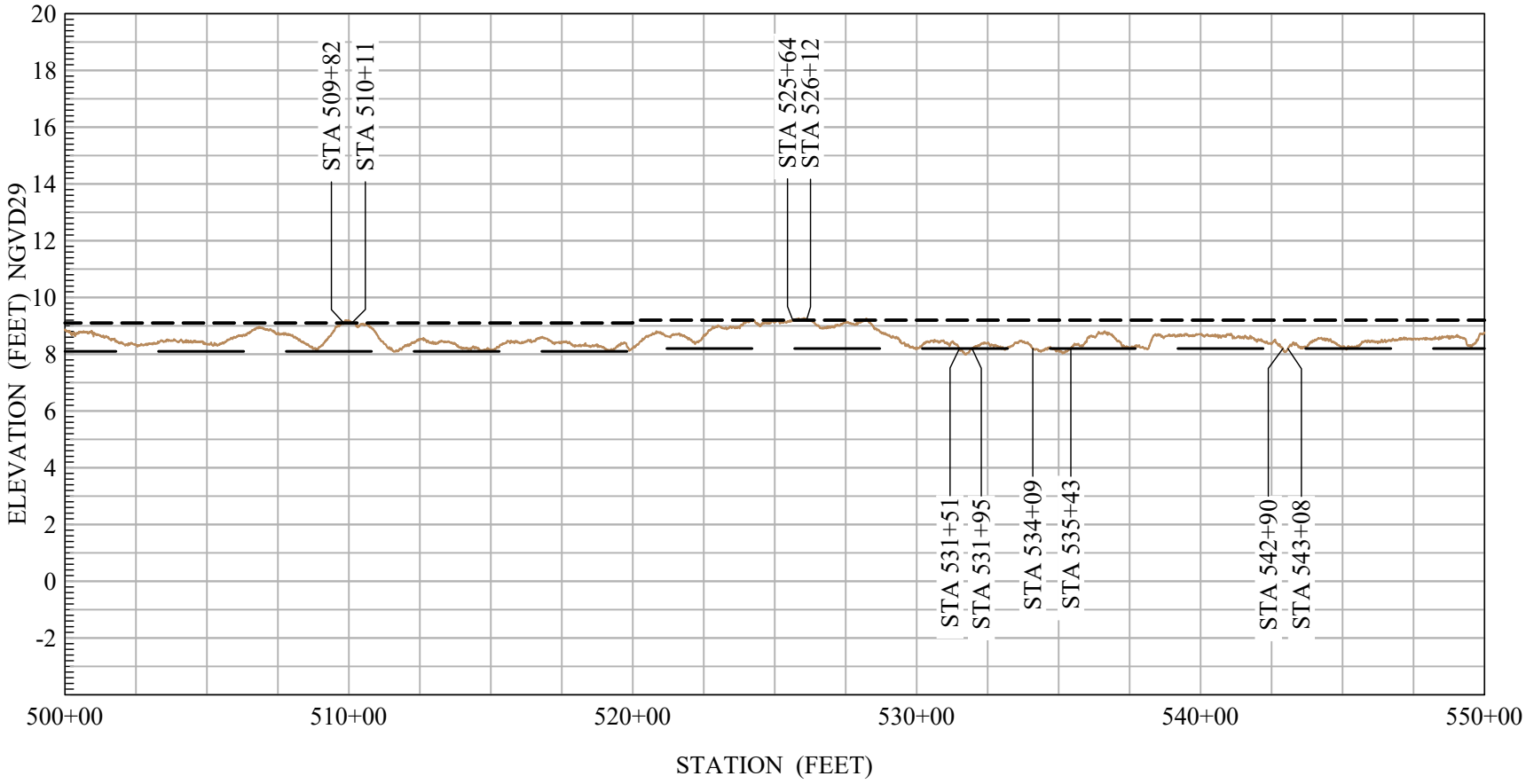
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 500+00 - 550+00



PROFILE SHEET: 11 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
- 2017 LiDAR Profile
- HMP Elevation
- Bulletin 192-82 Elevation

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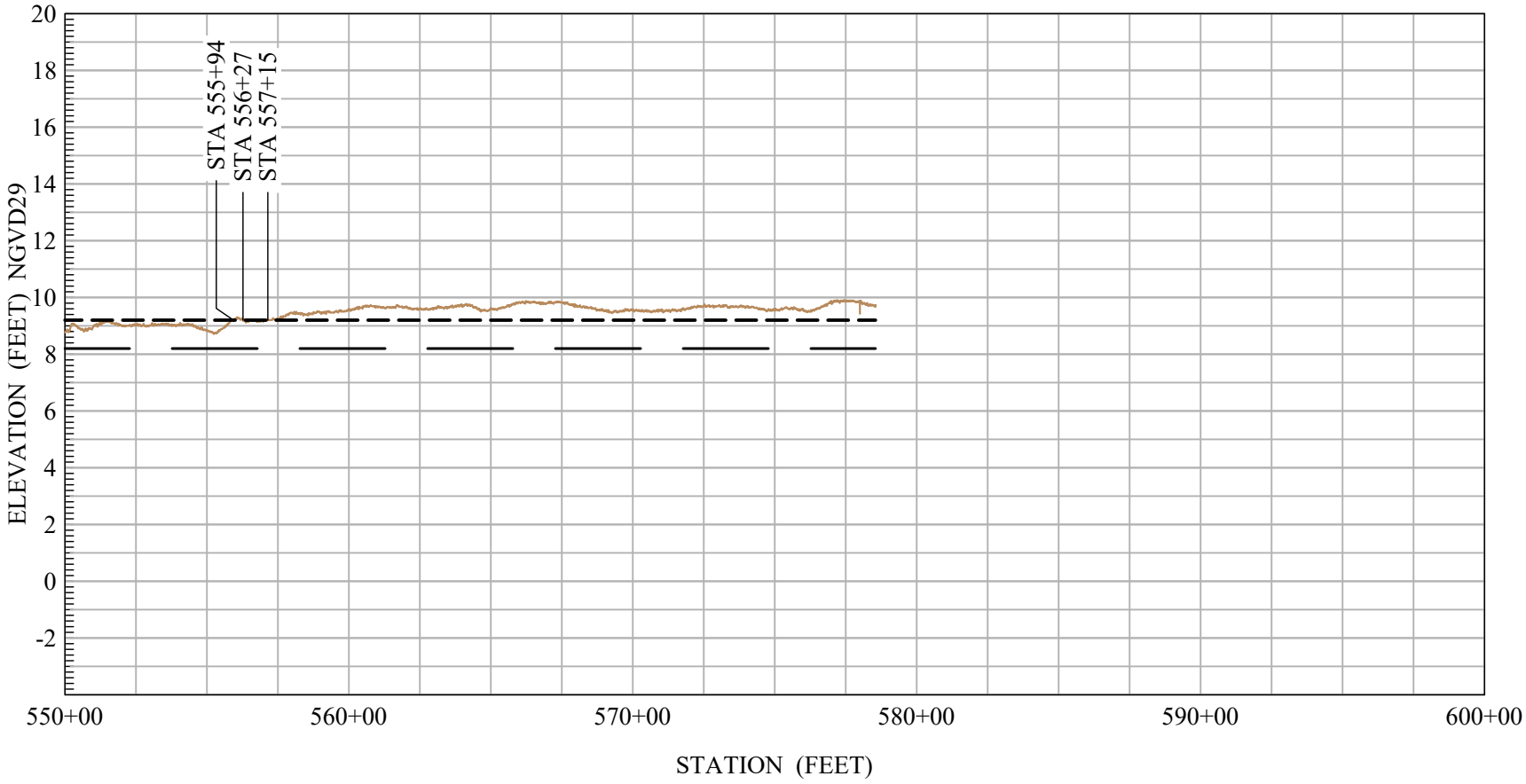
RD 2025 - HOLLAND TRACT
LEVEE CENTERLINE PROFILE 550+00 - 600+00



PROFILE SHEET: 12 OF 12

SCALE:

Vertical: 1" = 6'

Horizontal: 1" = 600'

LEGEND:

- 2014 As-built Profile
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- HMP Elevation
- Bulletin 192-82 Elevation

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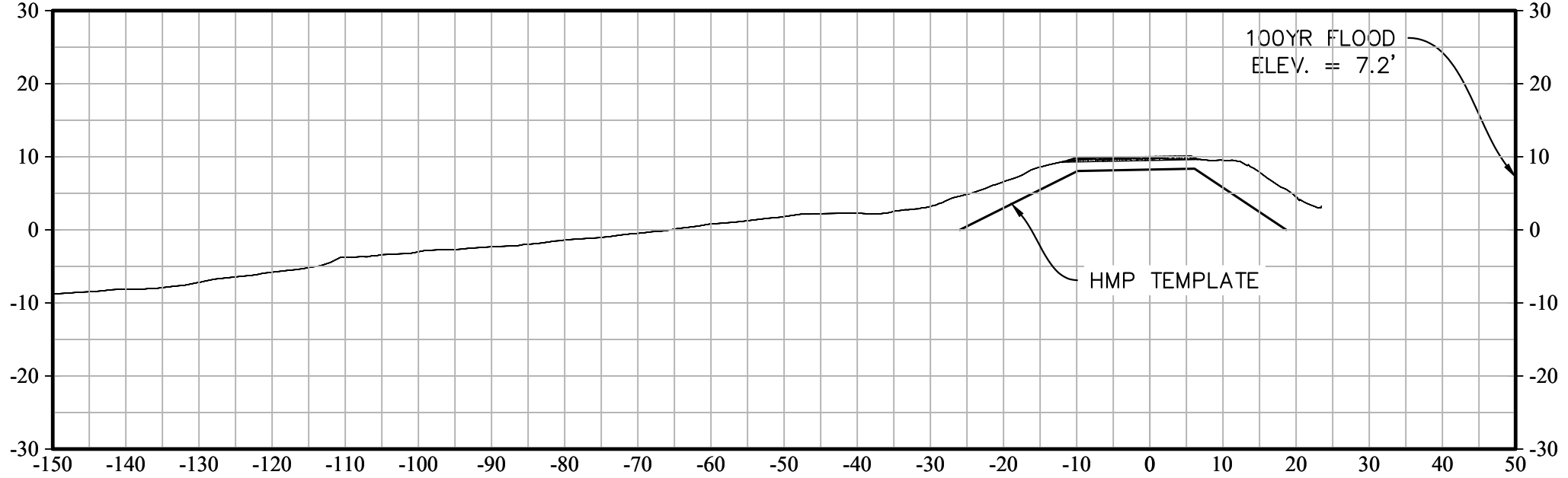
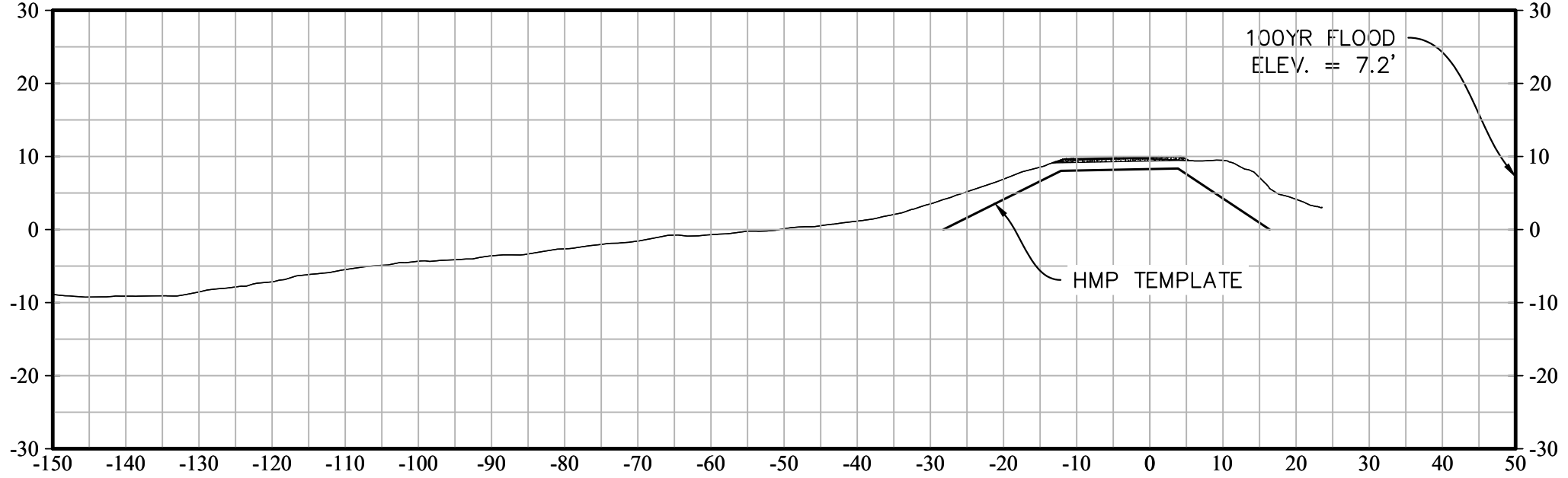
0+00



5+00



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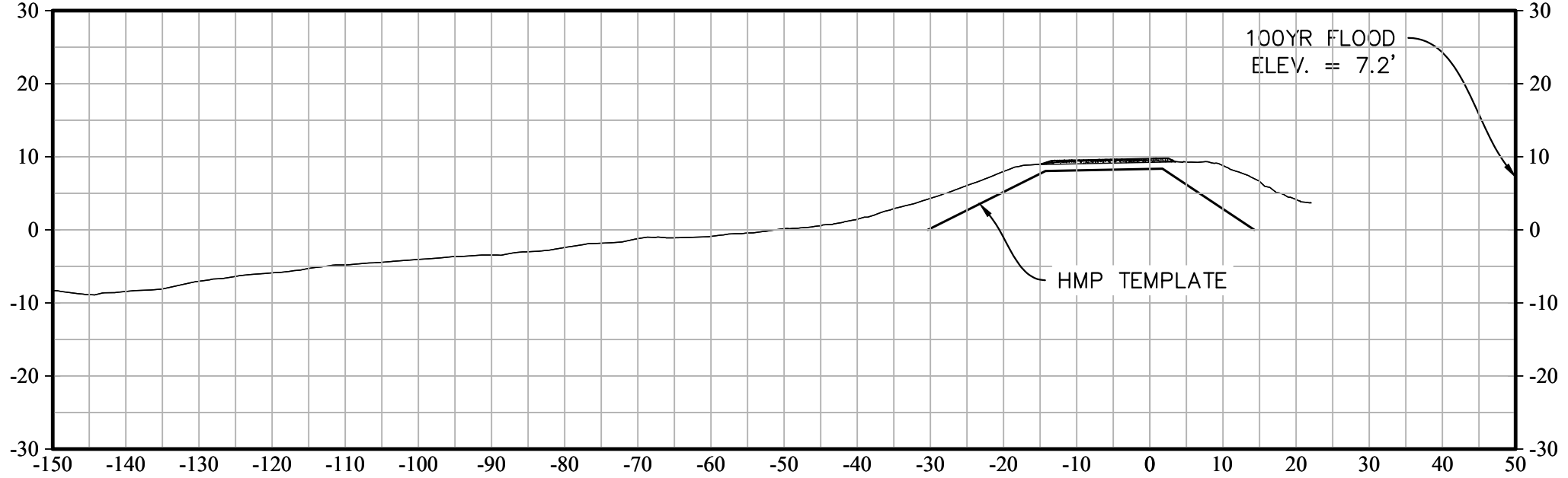
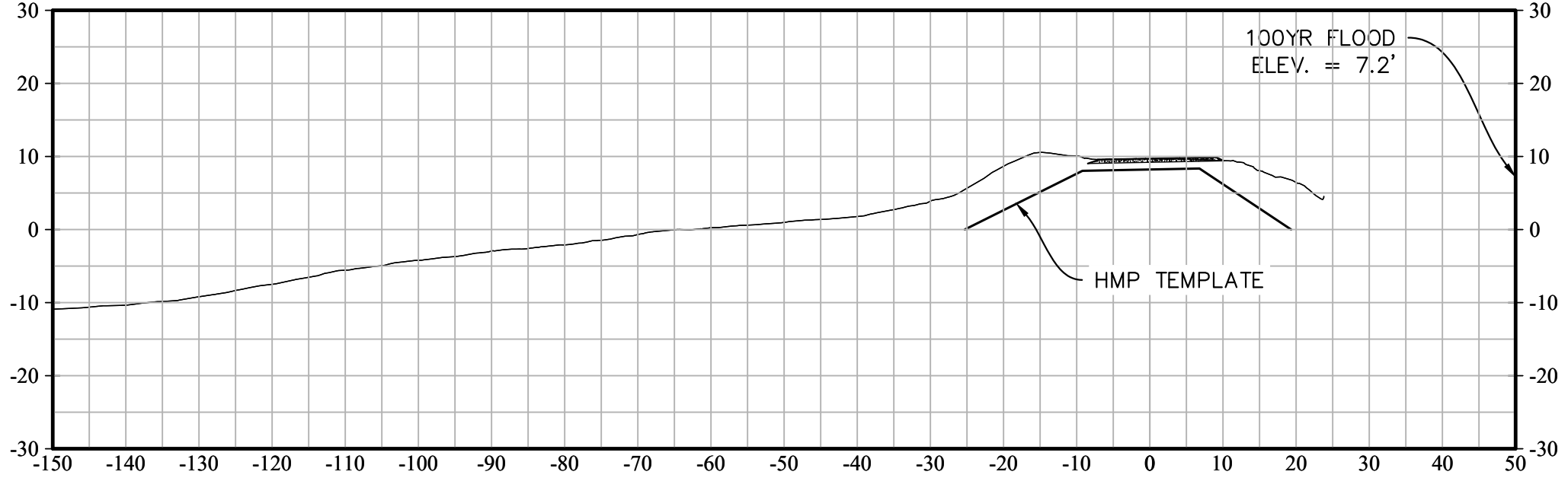
10+00



15+00



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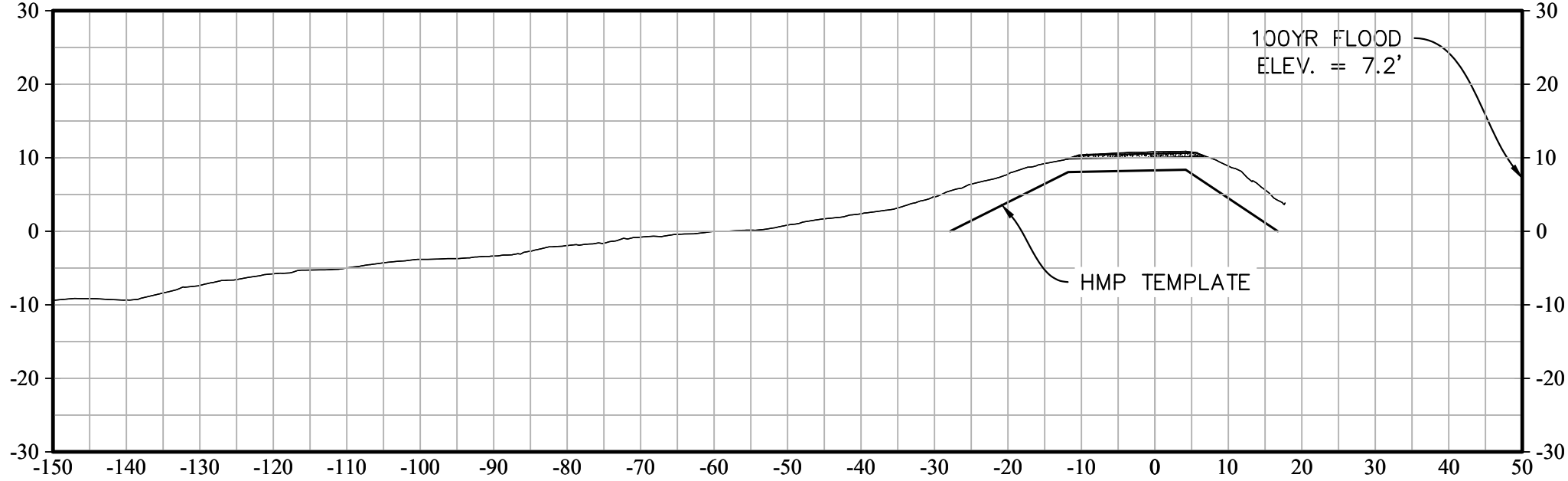
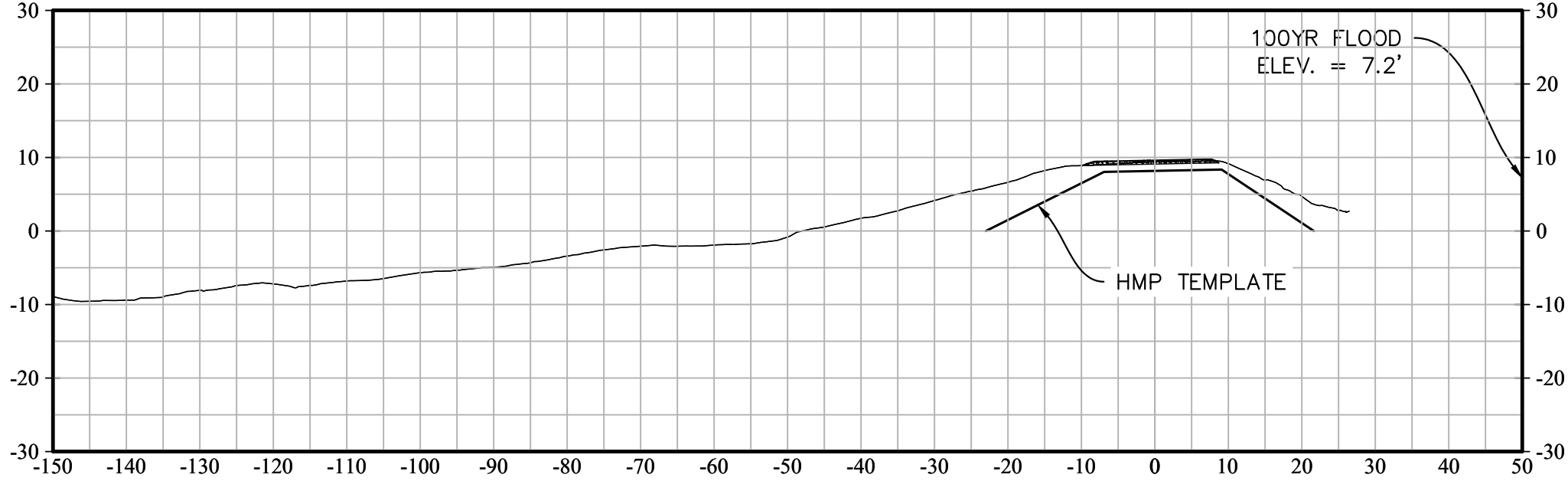
20+00



25+00



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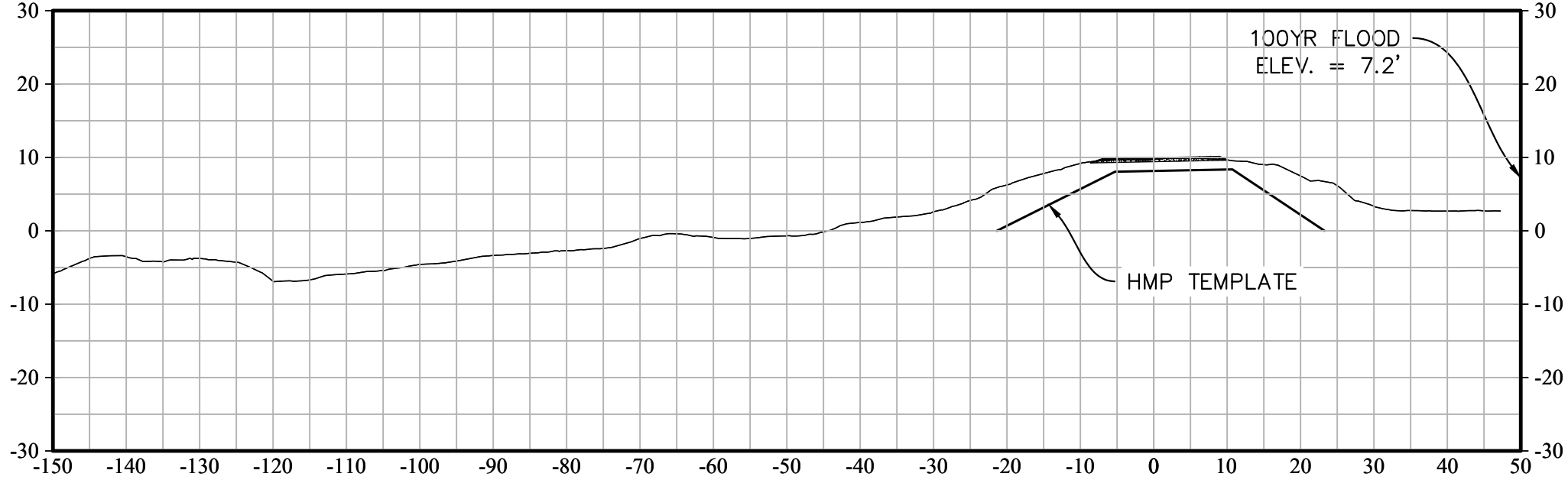
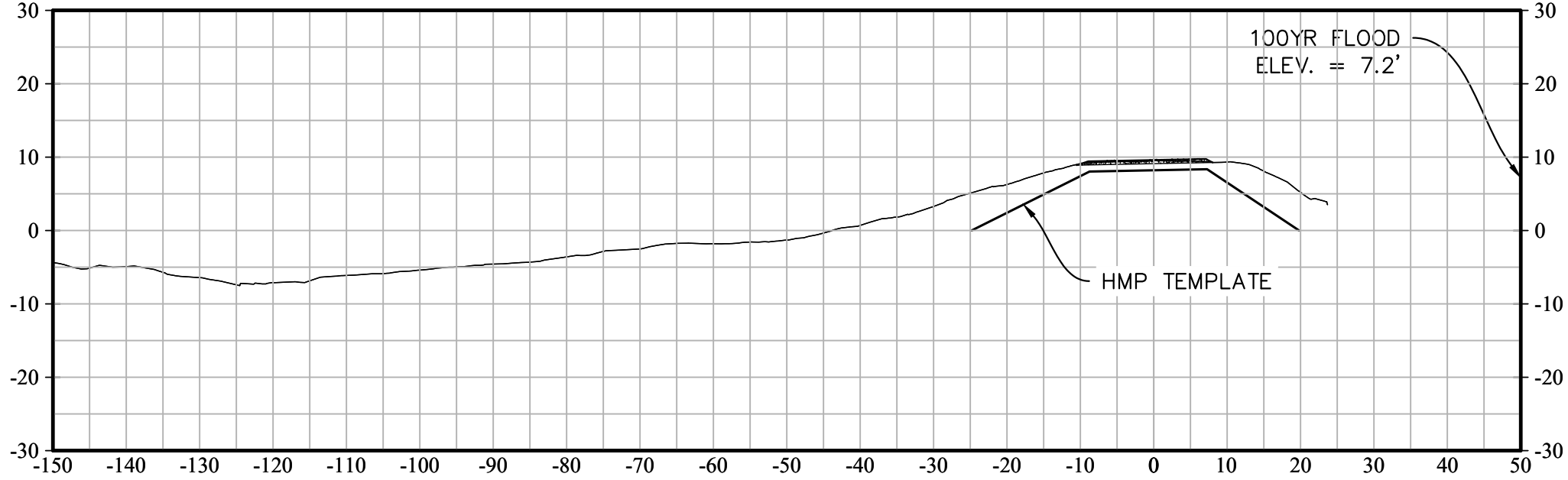
30+00



35+00



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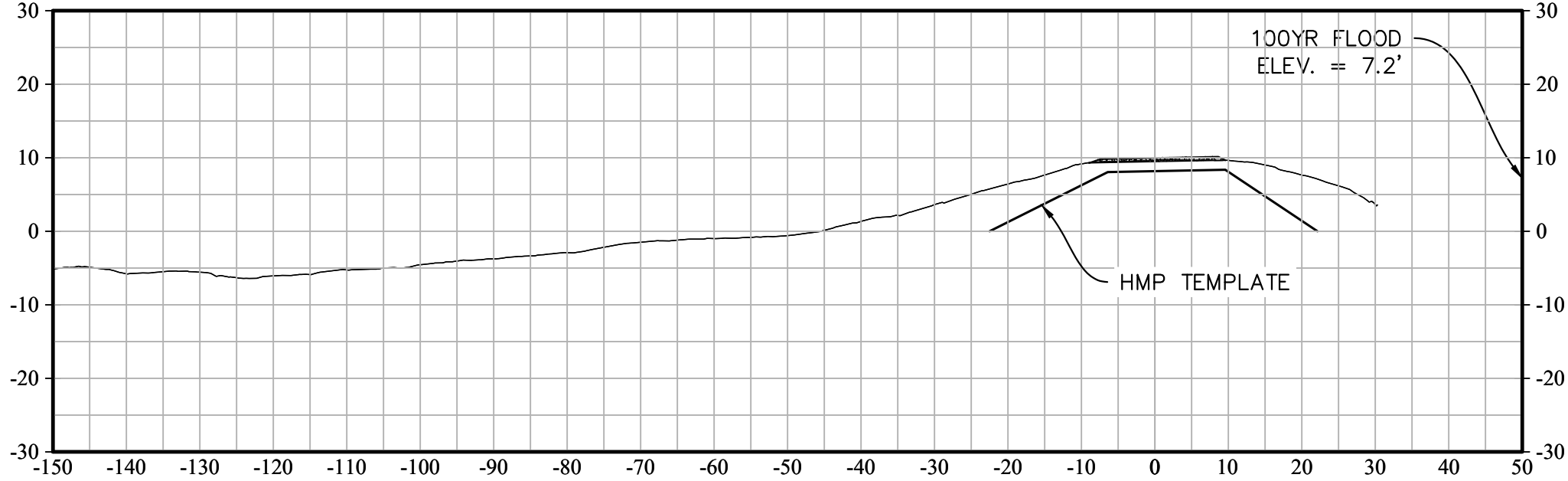
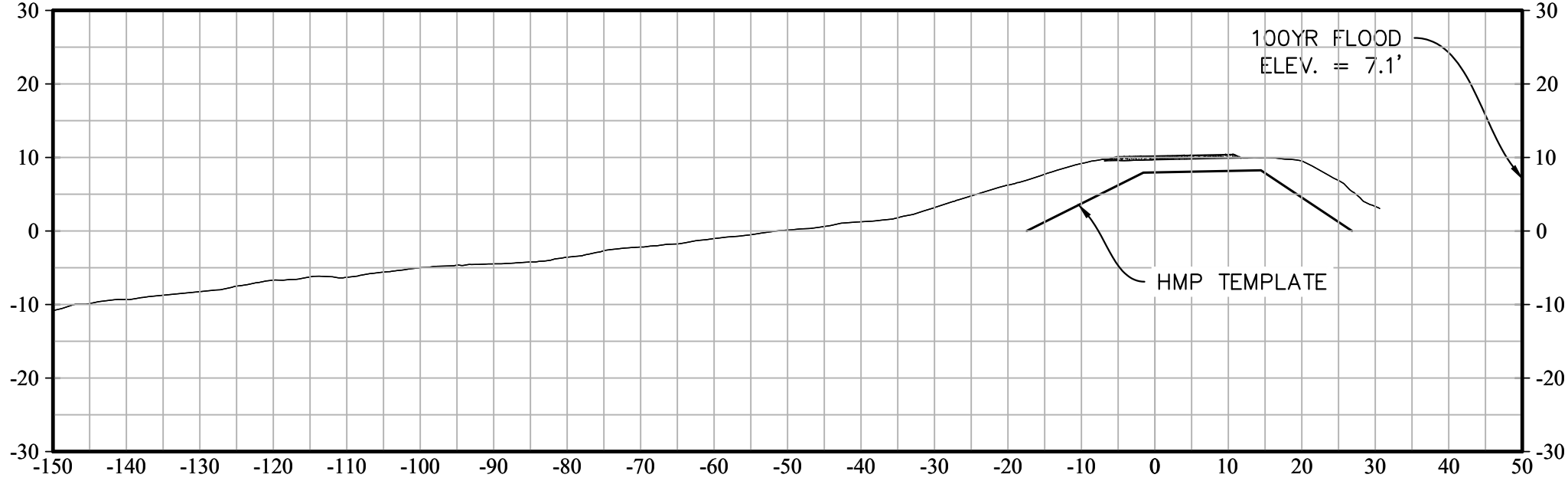
40+00



45+00



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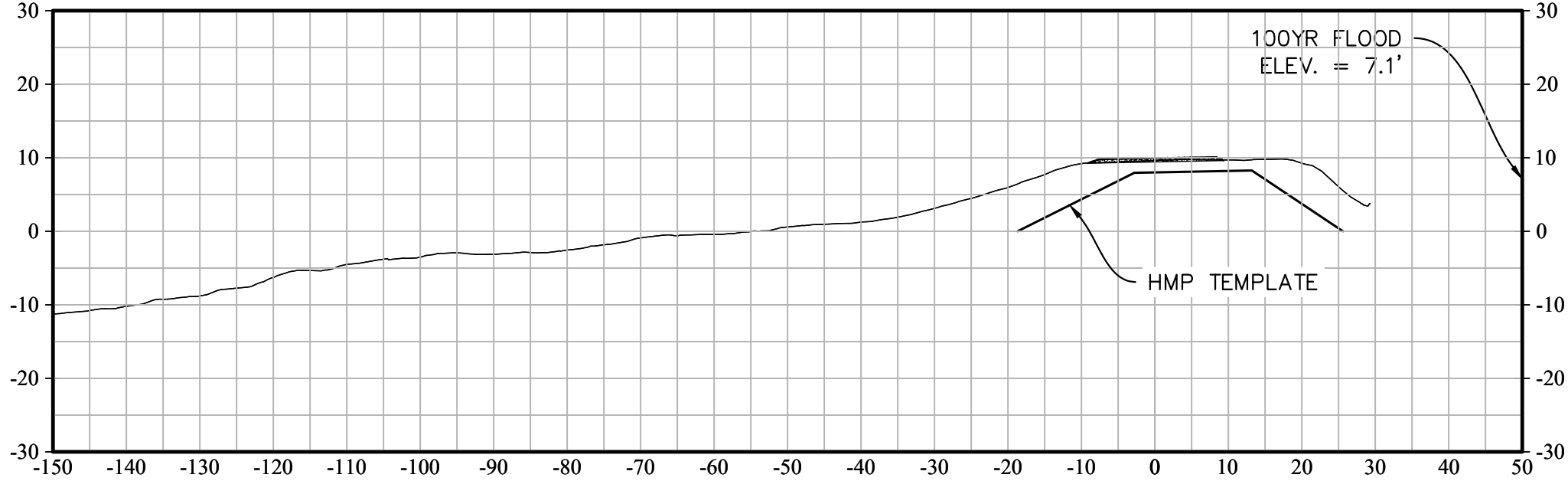
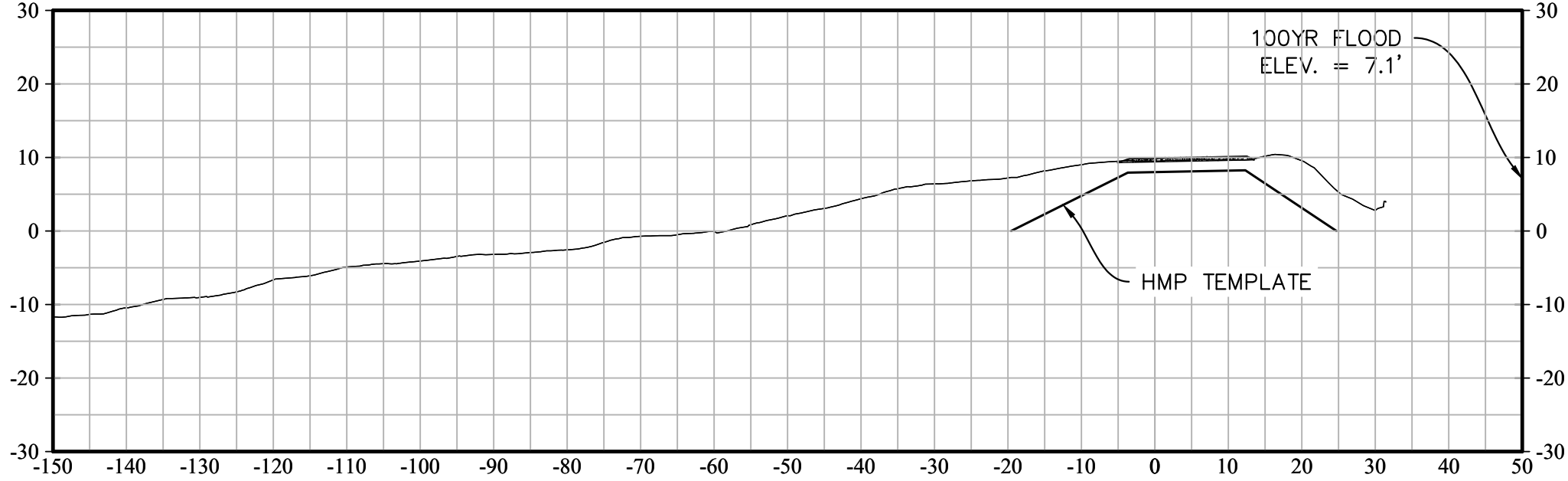
50+00



55+00



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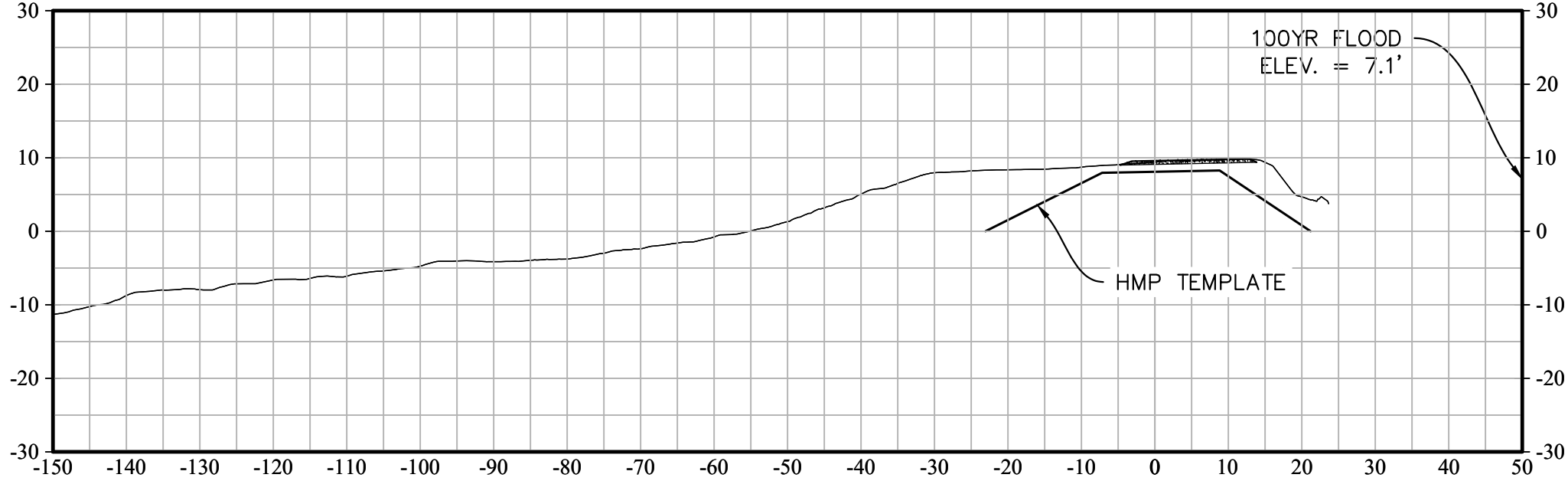
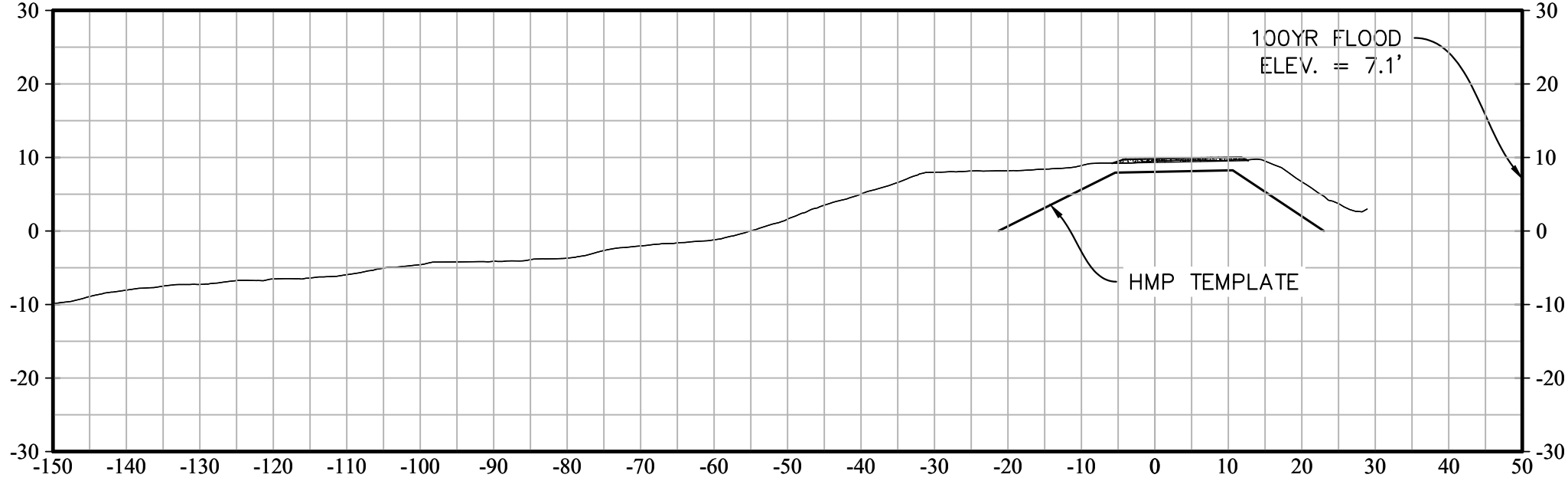
60+00



65+00



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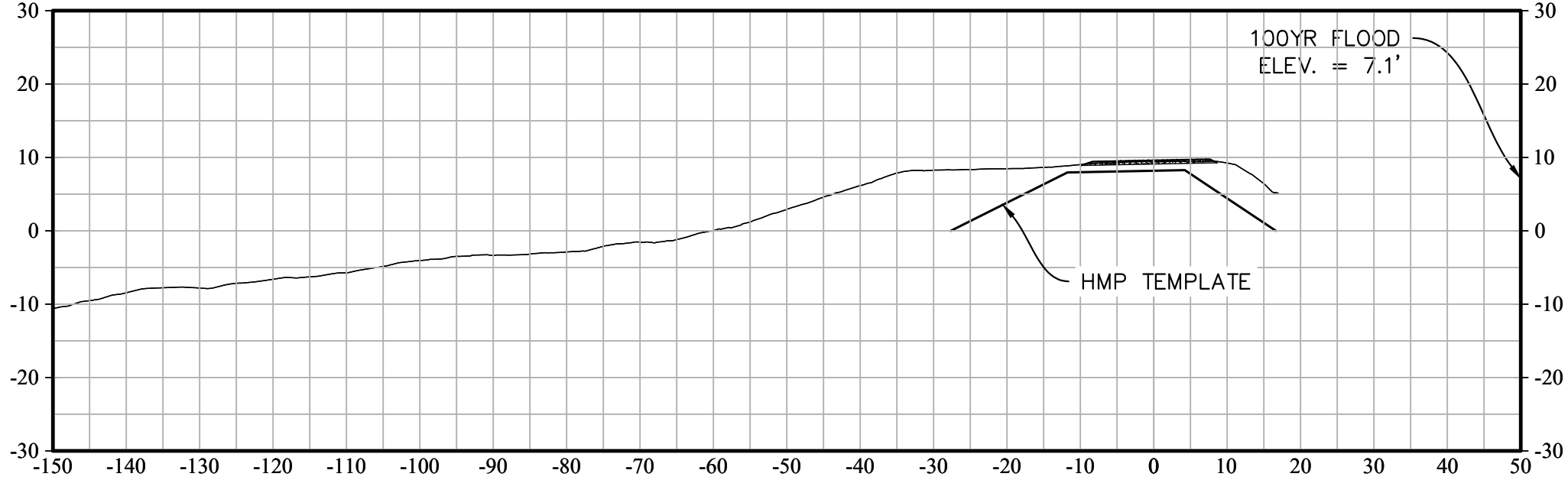
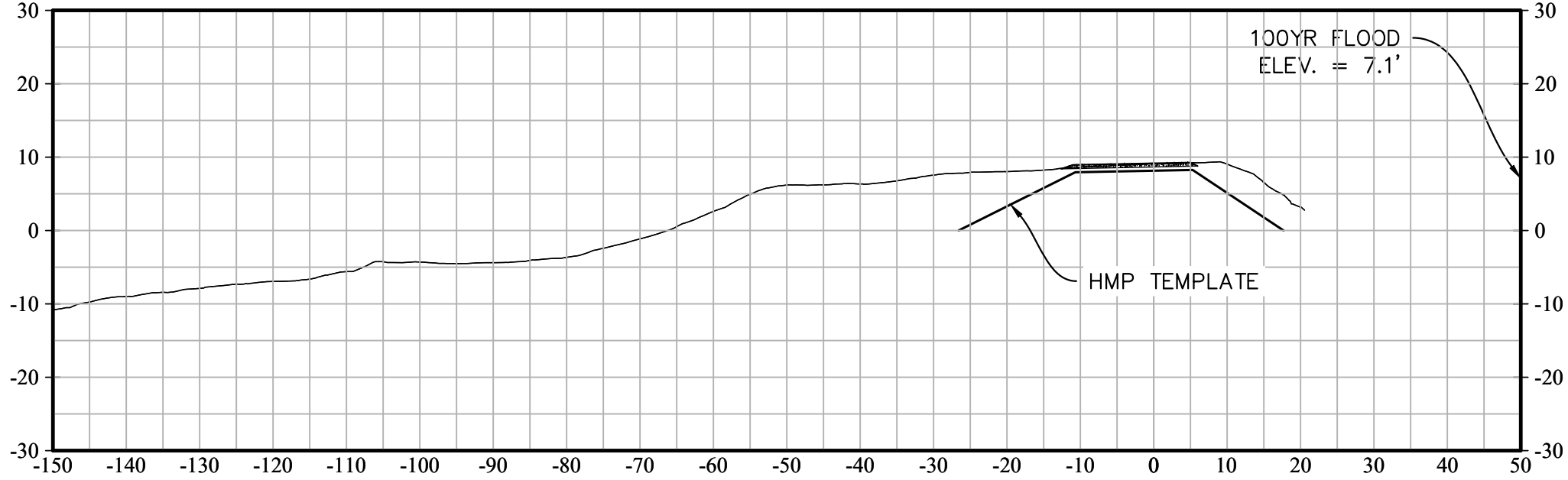
70+00



75+00



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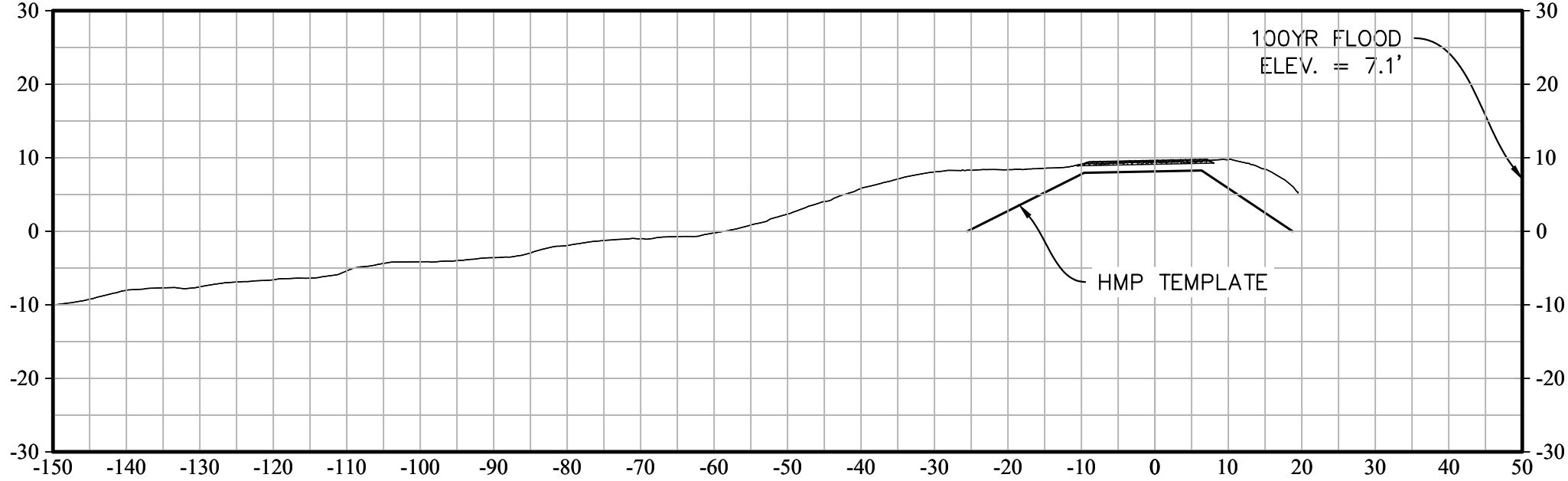
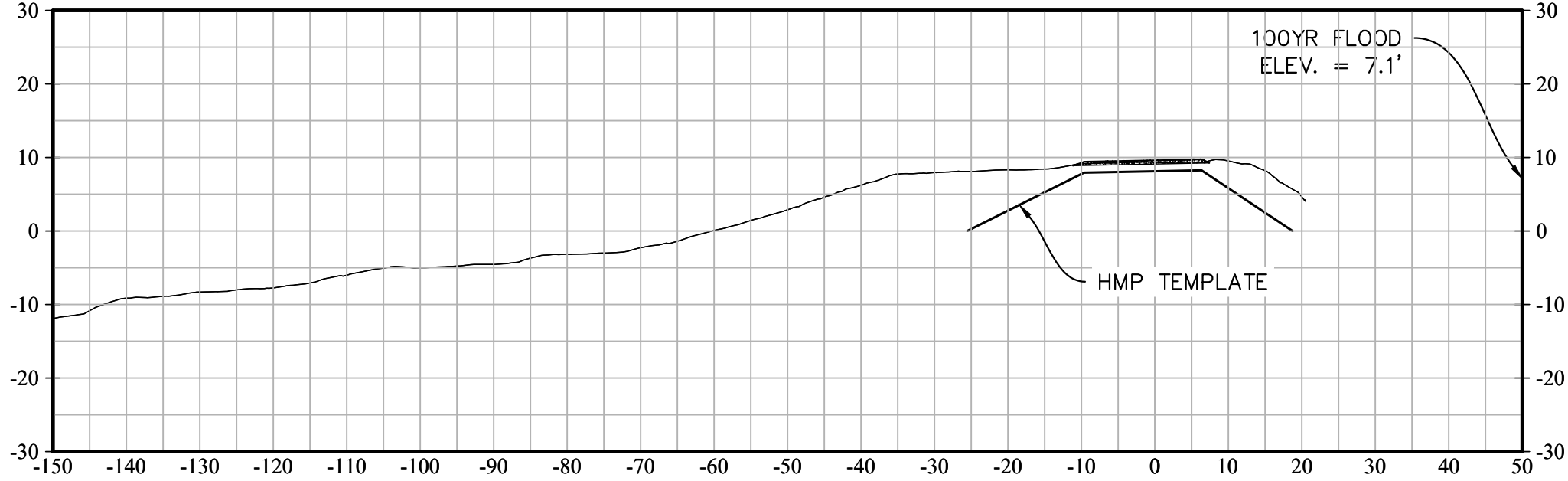
80+00



85+00



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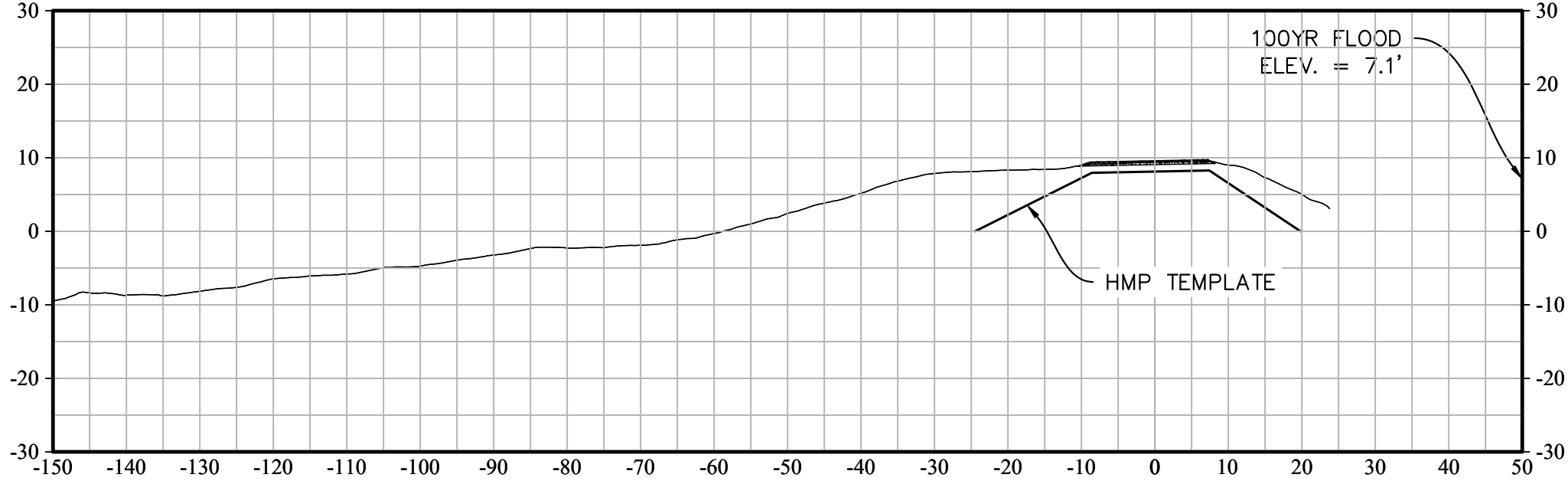
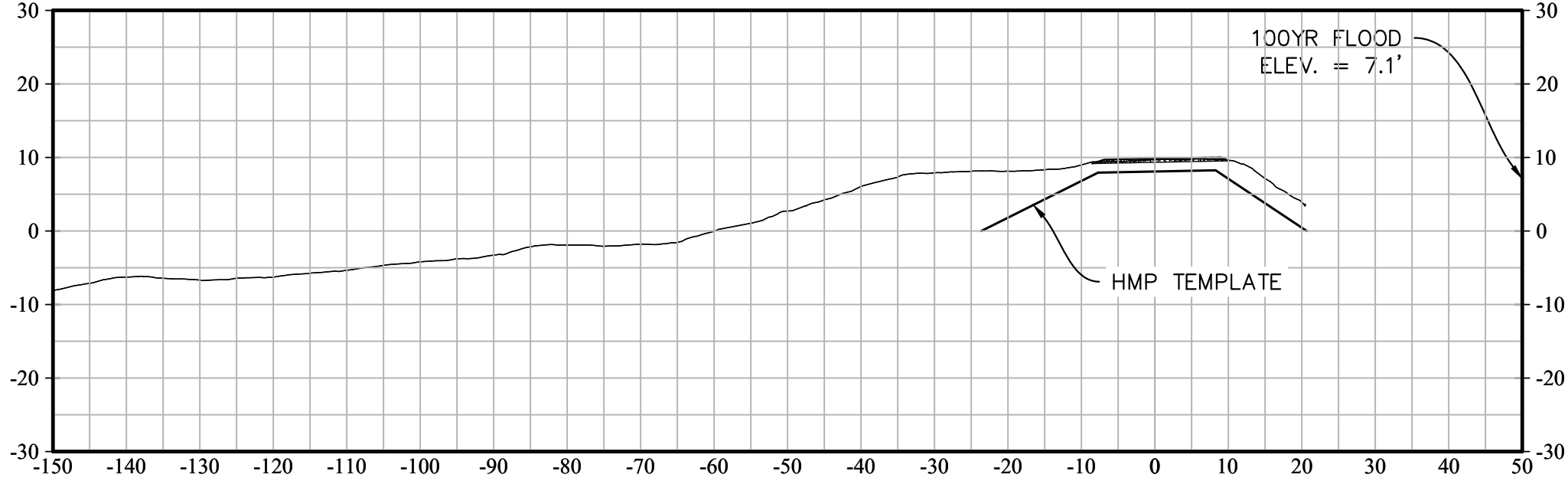
90+00



95+00



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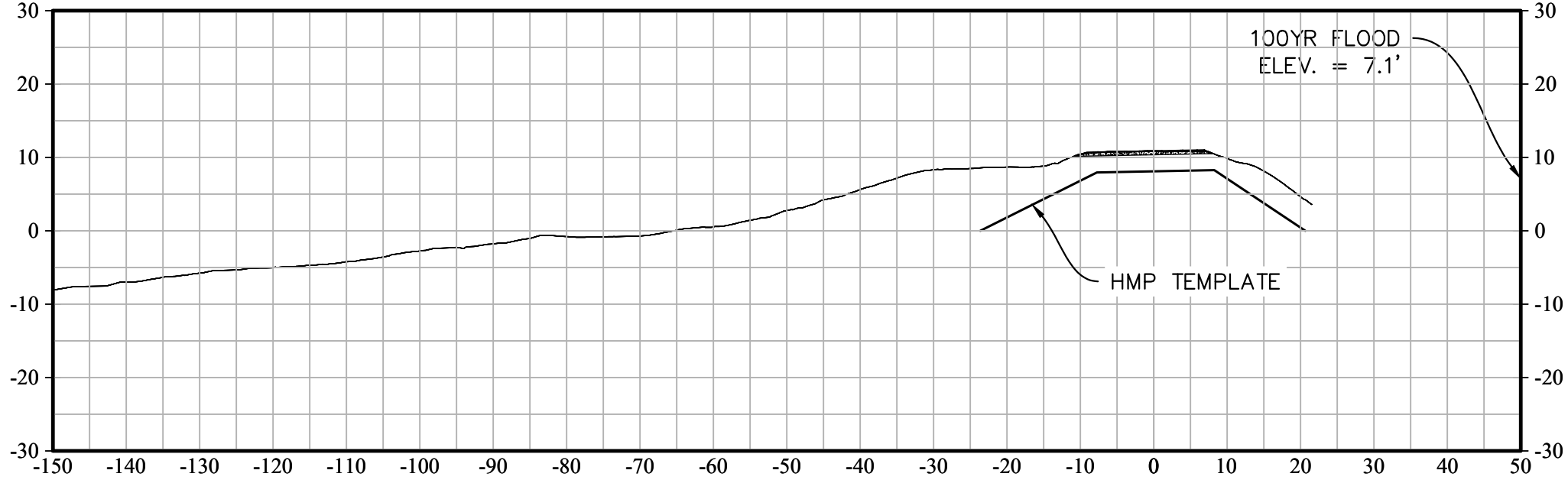
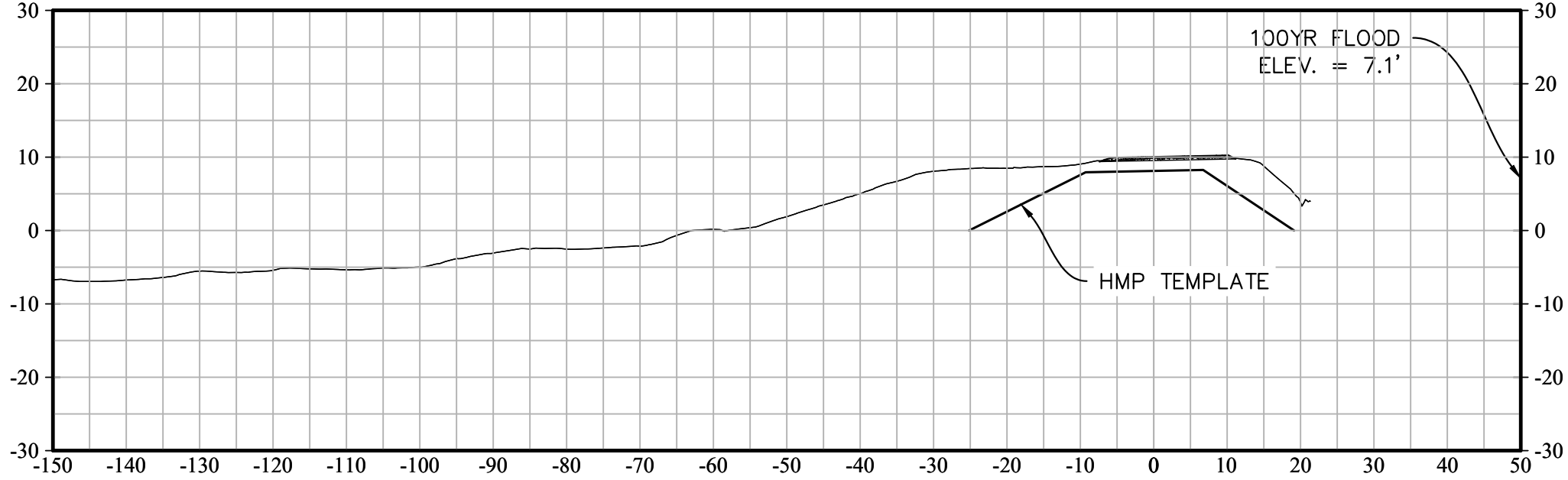
100+00



105+00



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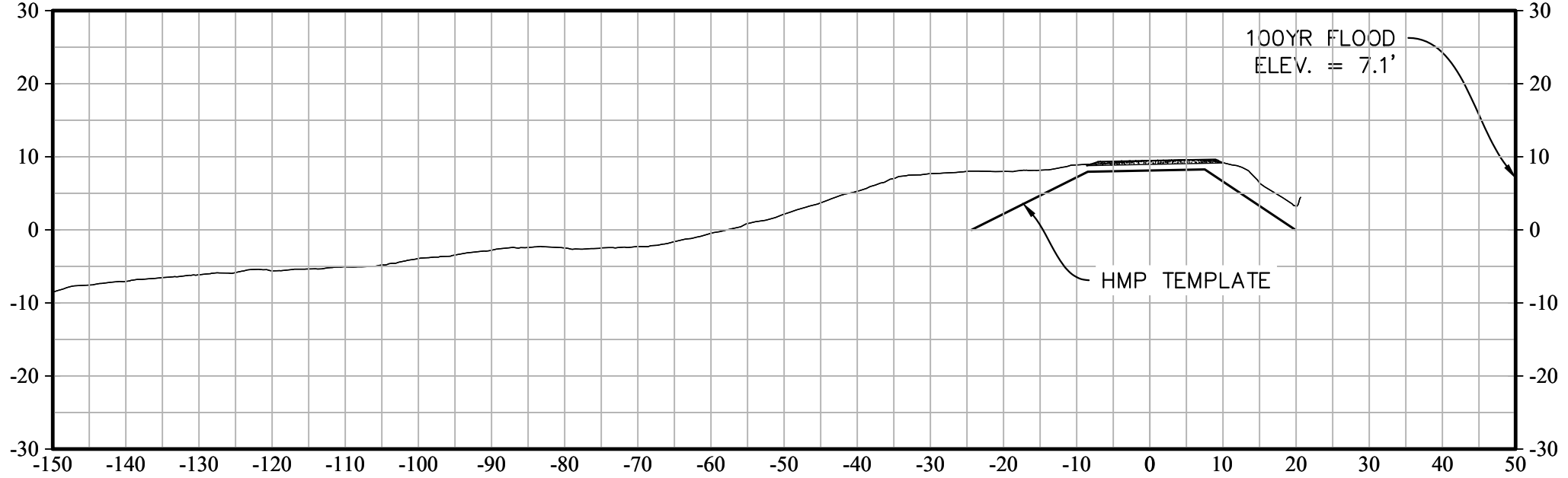
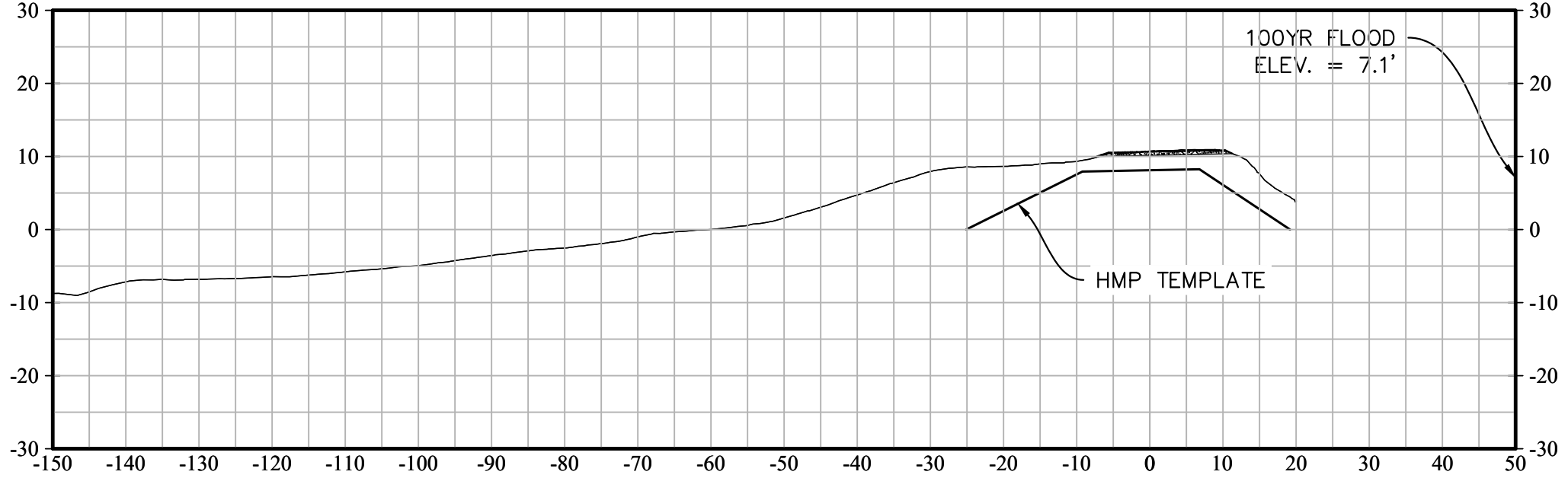
110+00



115+00



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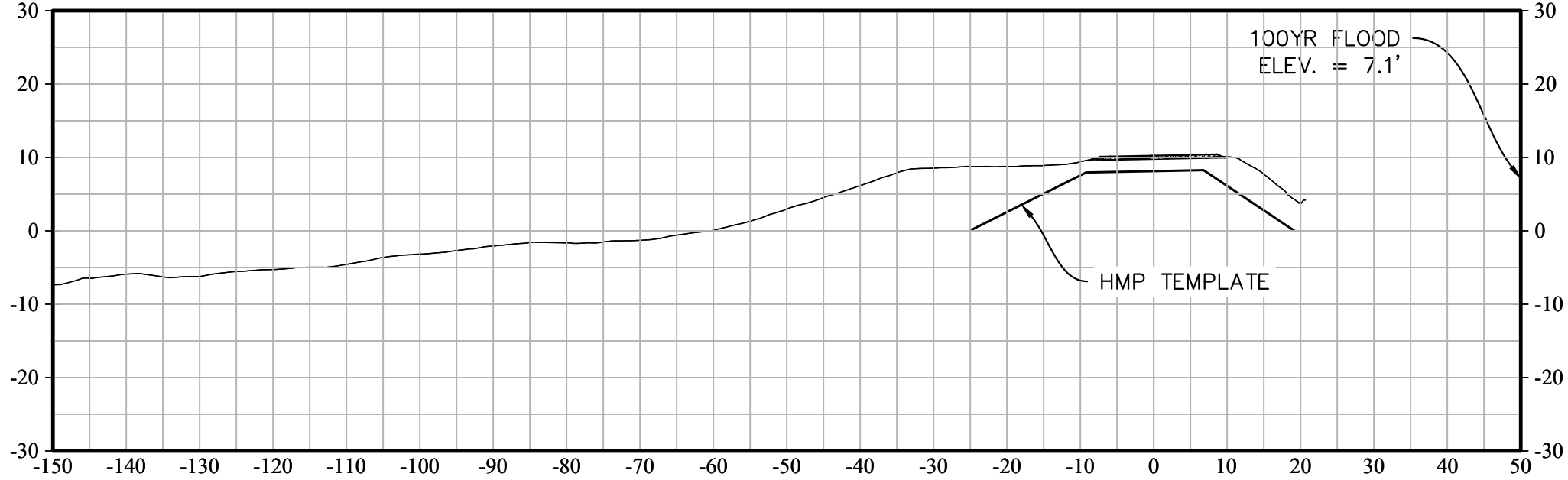
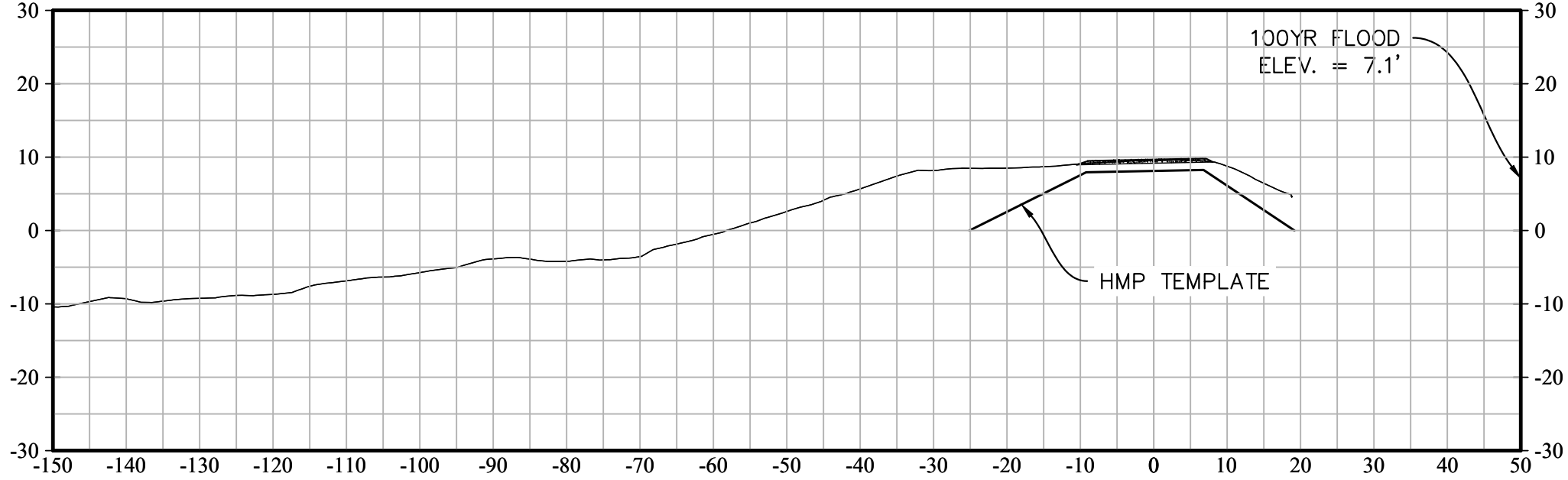
120+00



125+00



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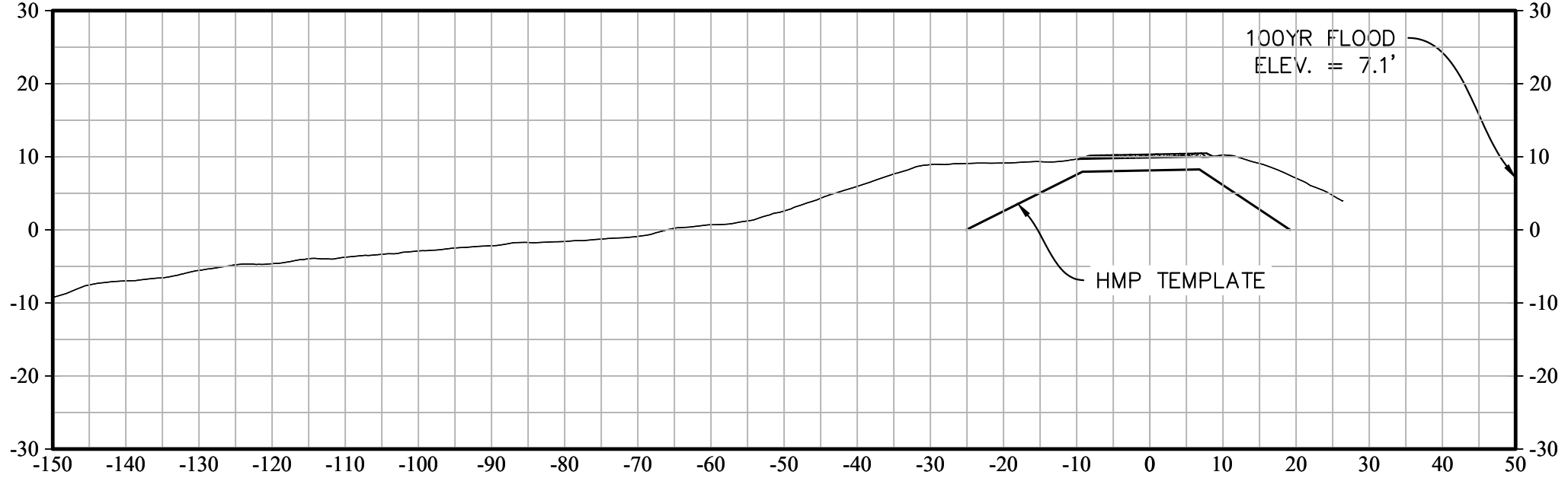
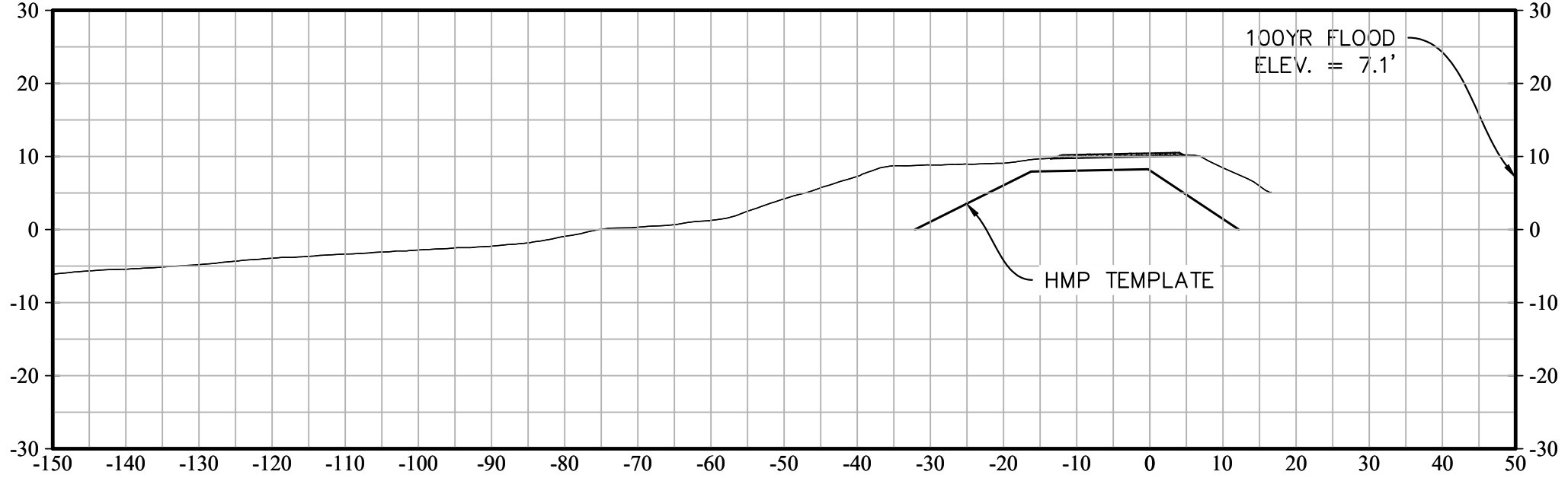
130+00



135+00



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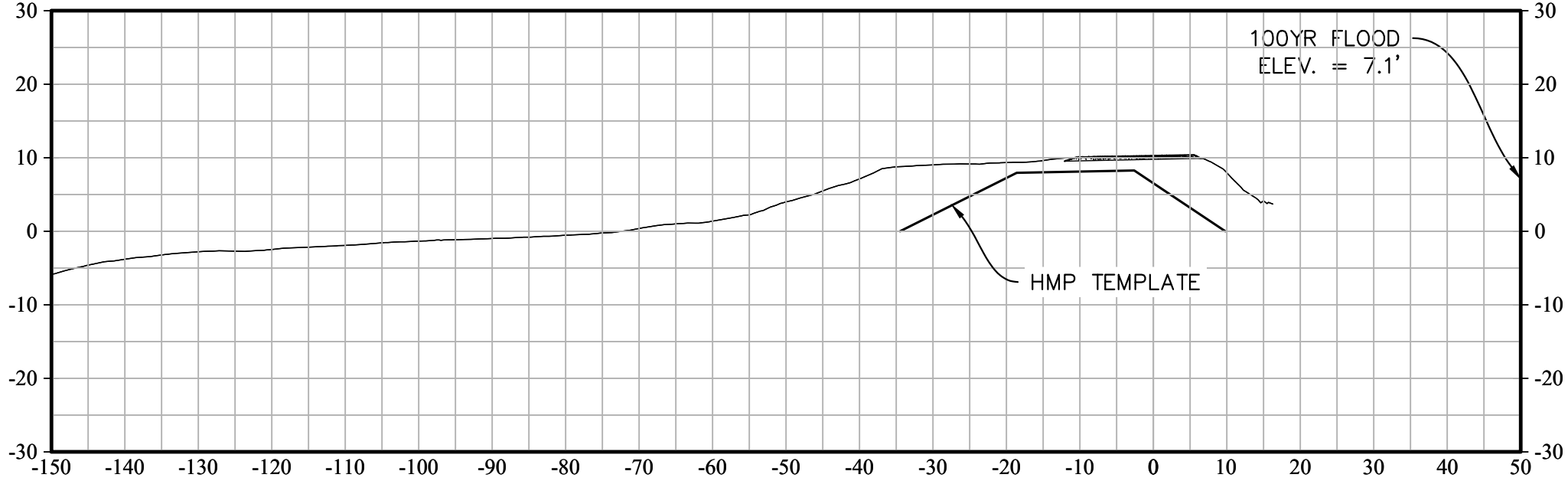
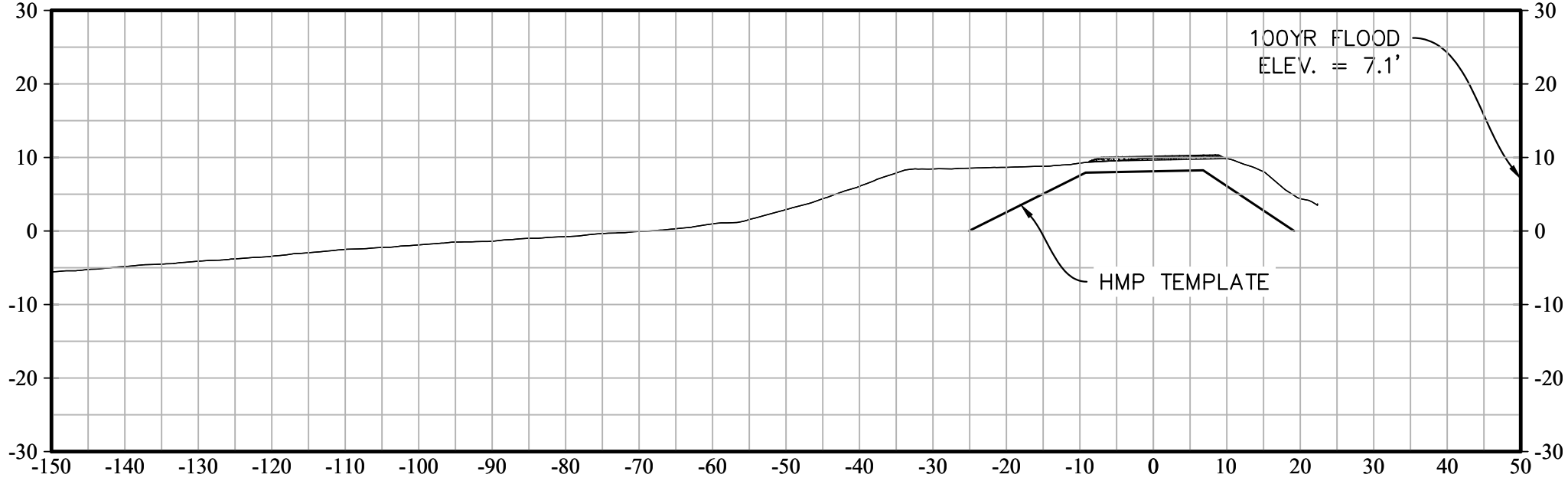
140+00



145+00



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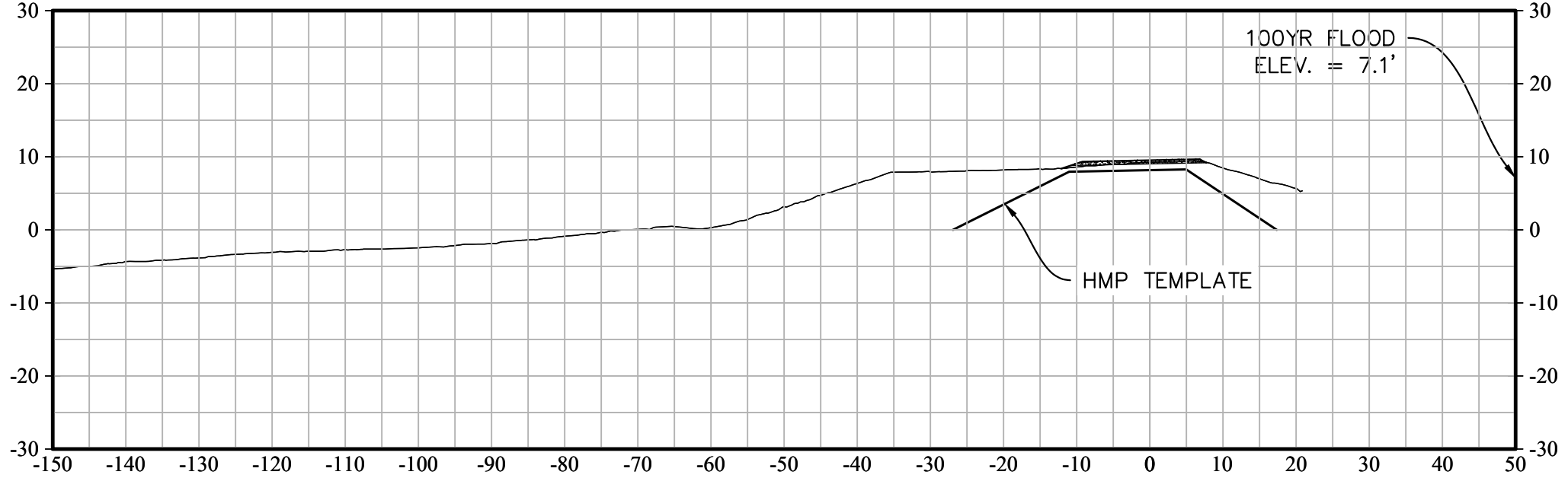
150+00



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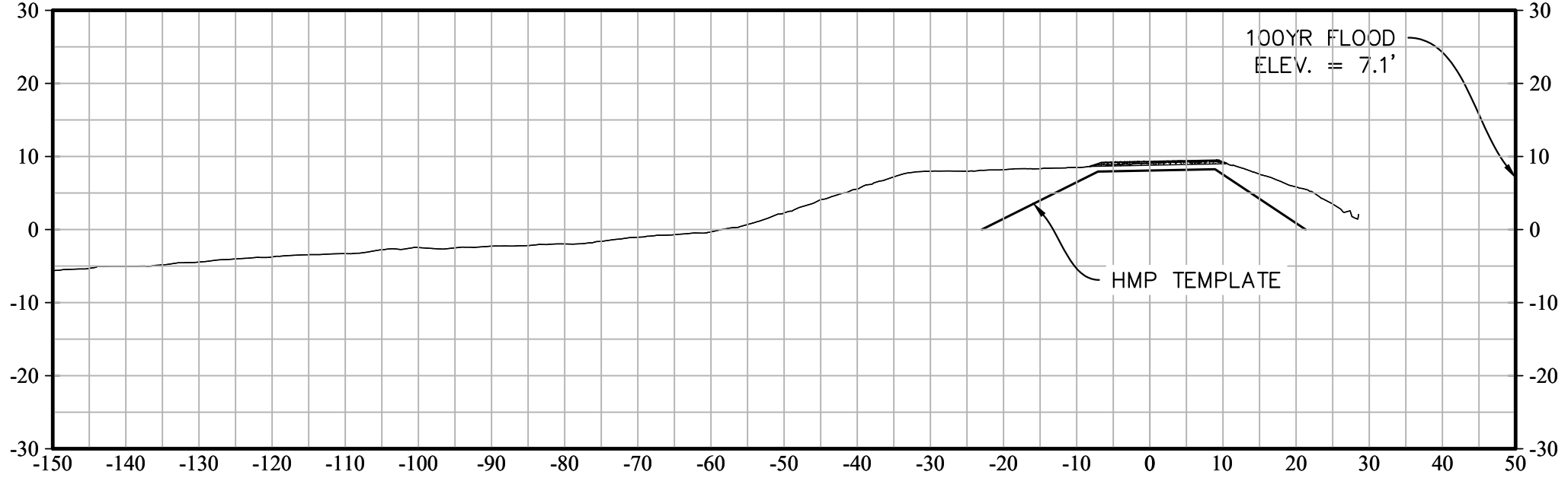

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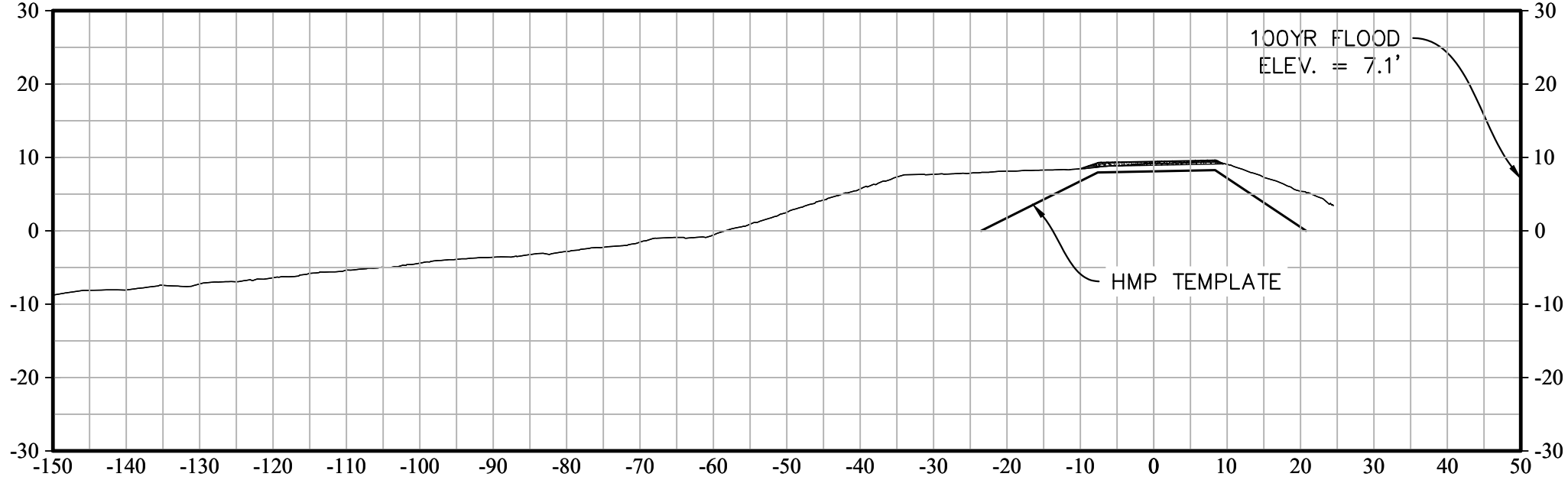
160+00



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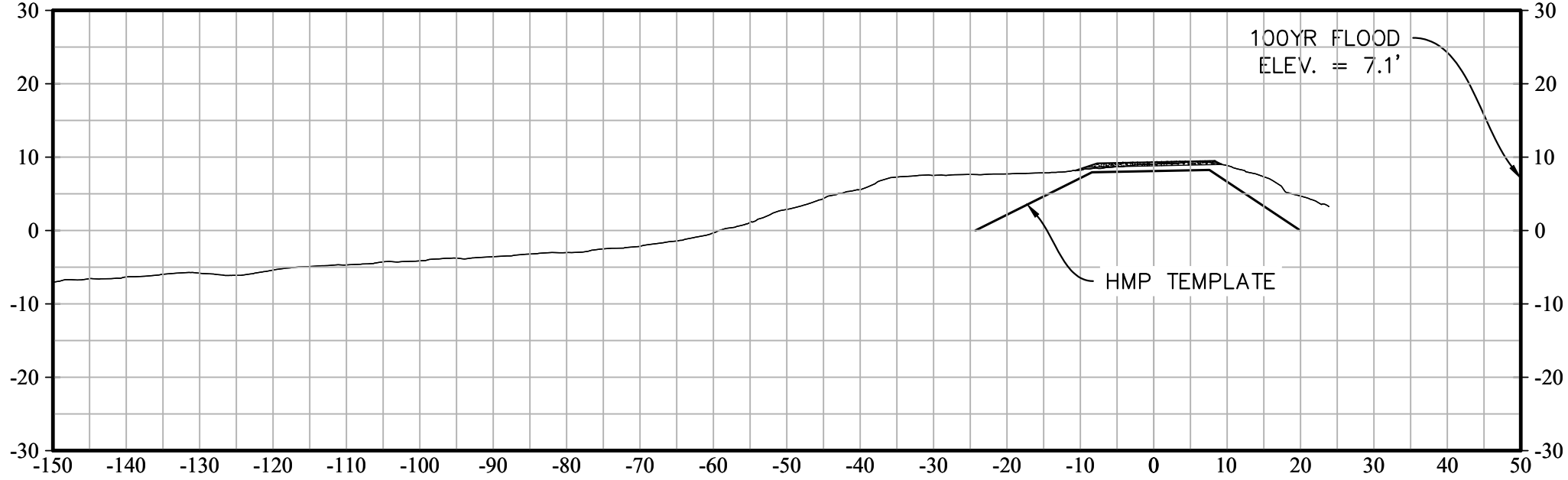

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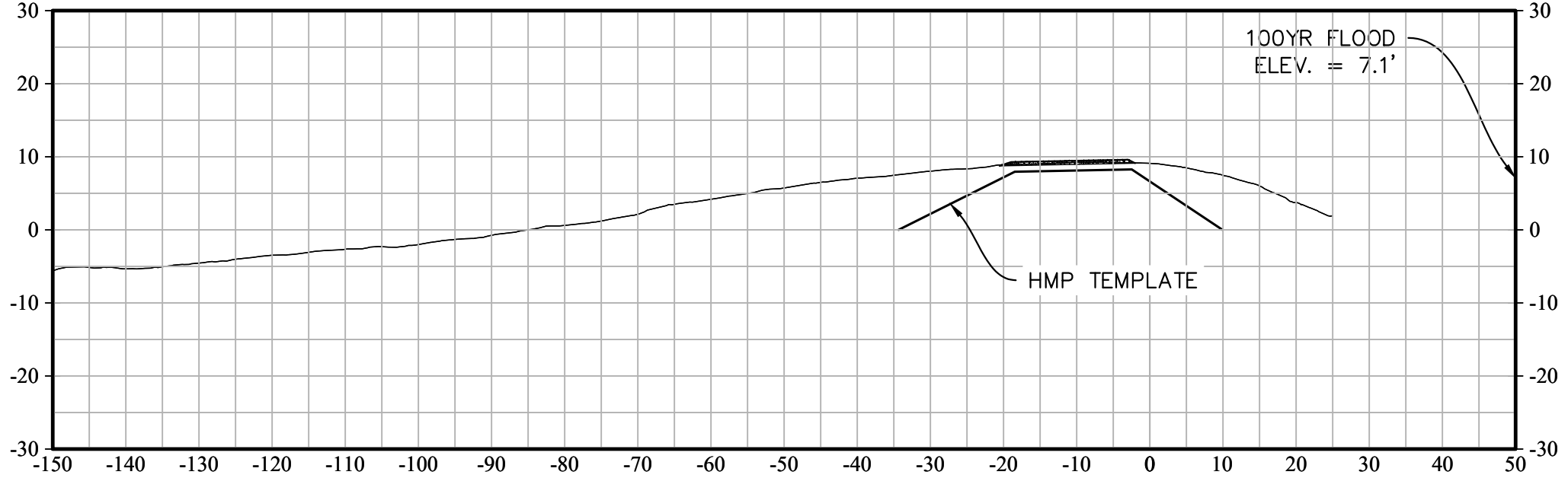
170+00



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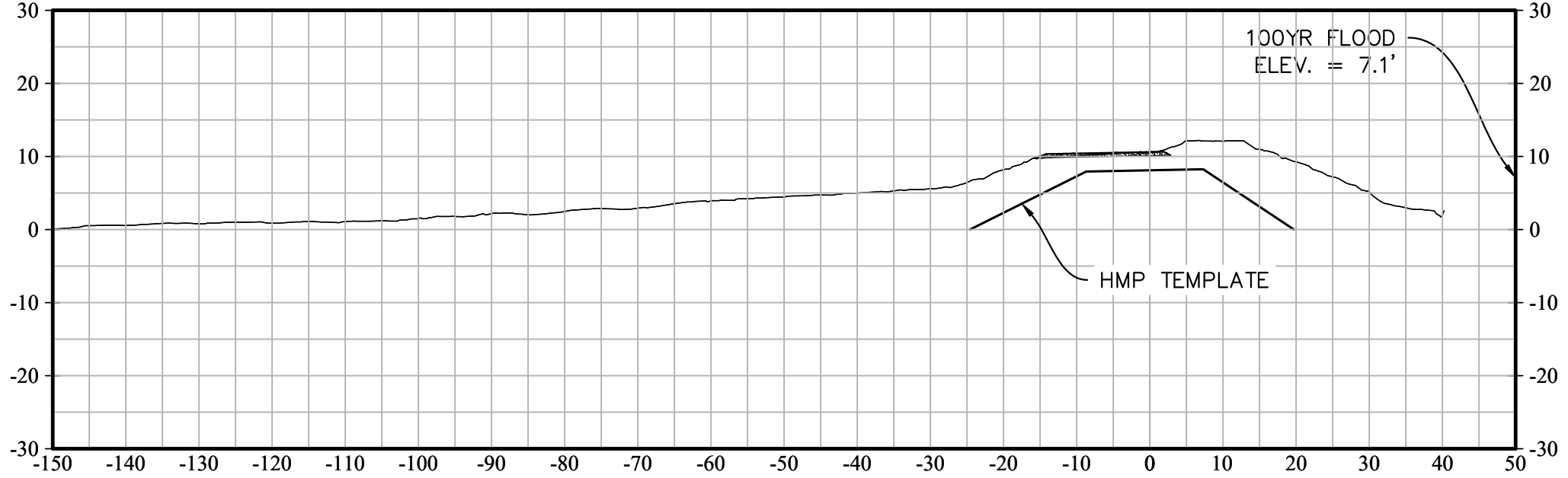

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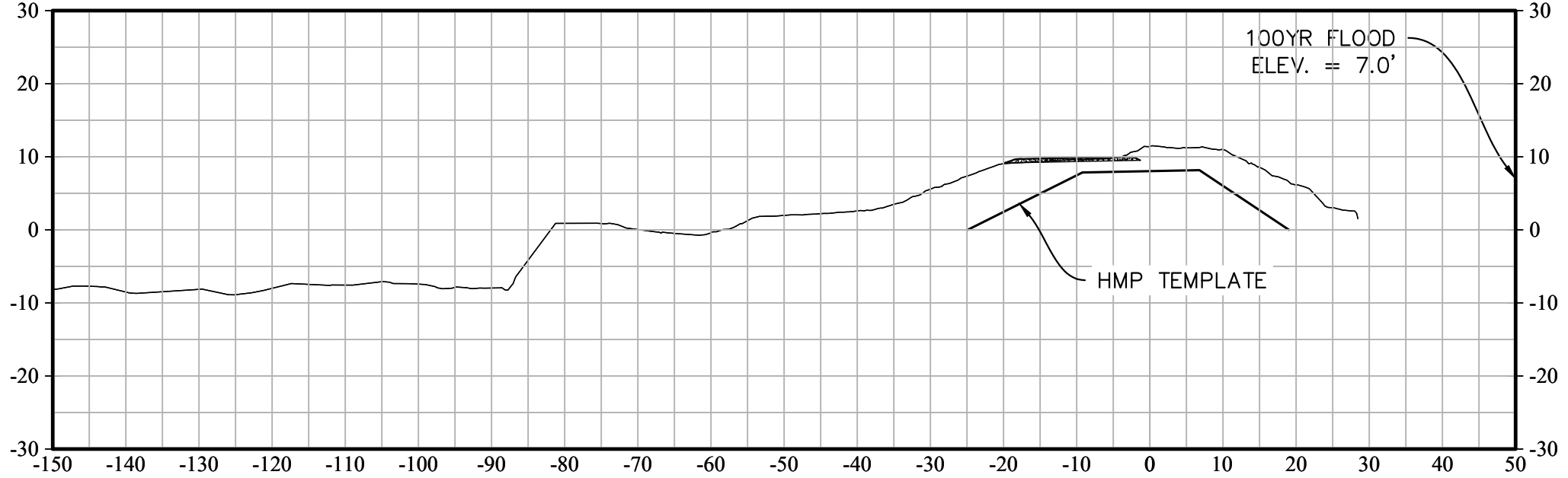

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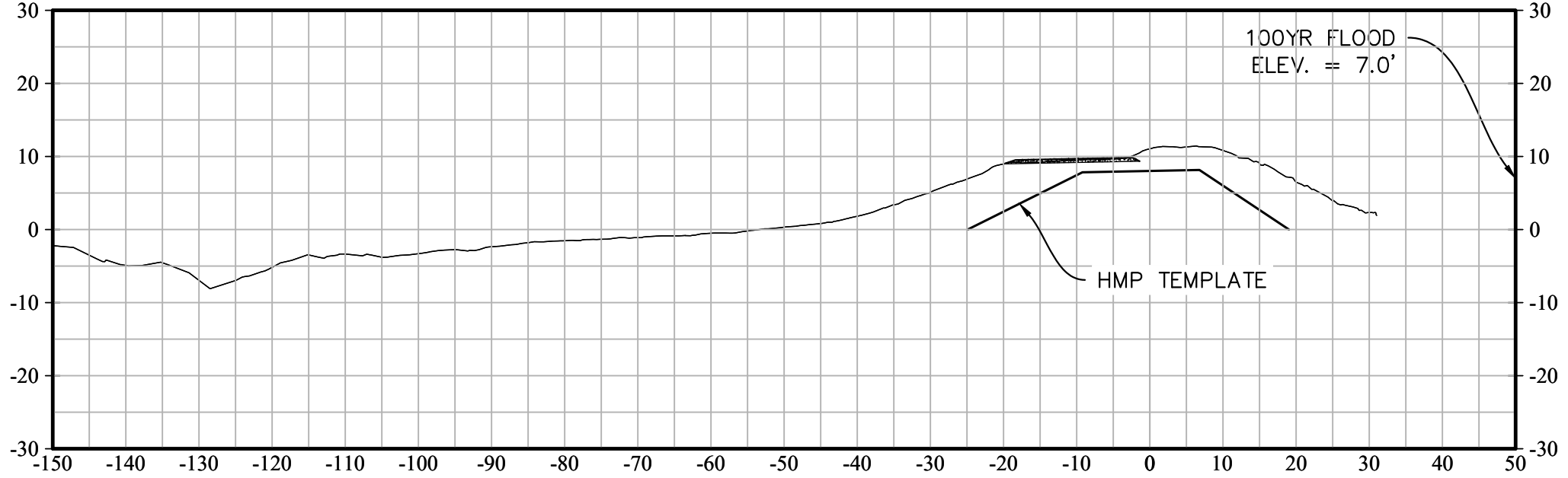

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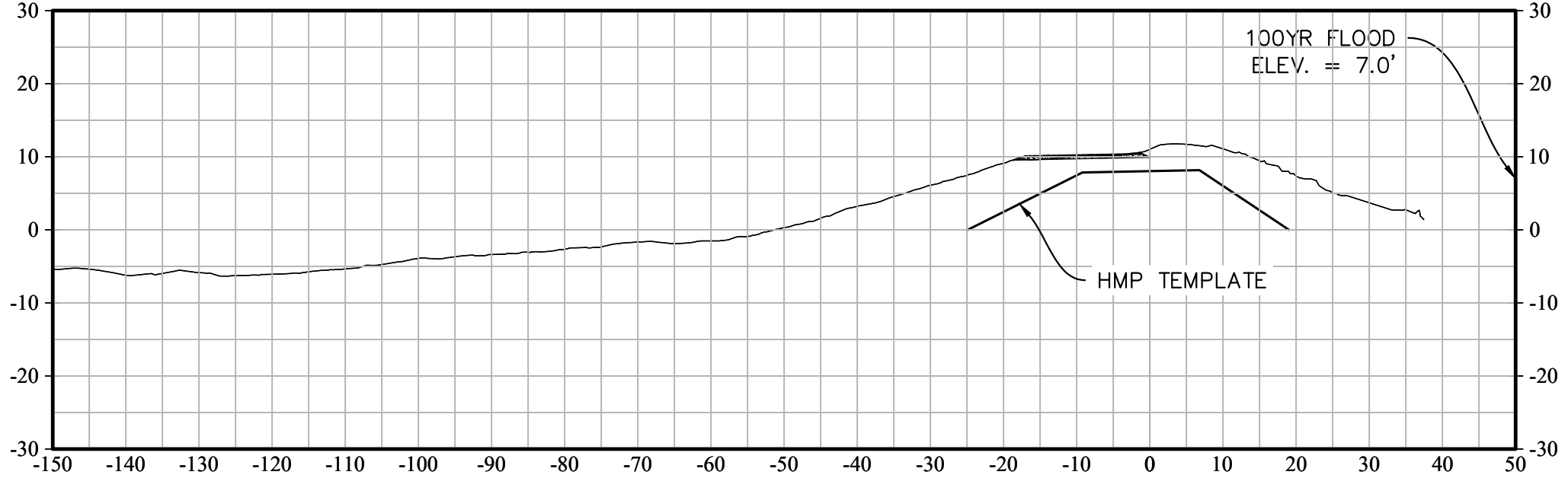
190+00



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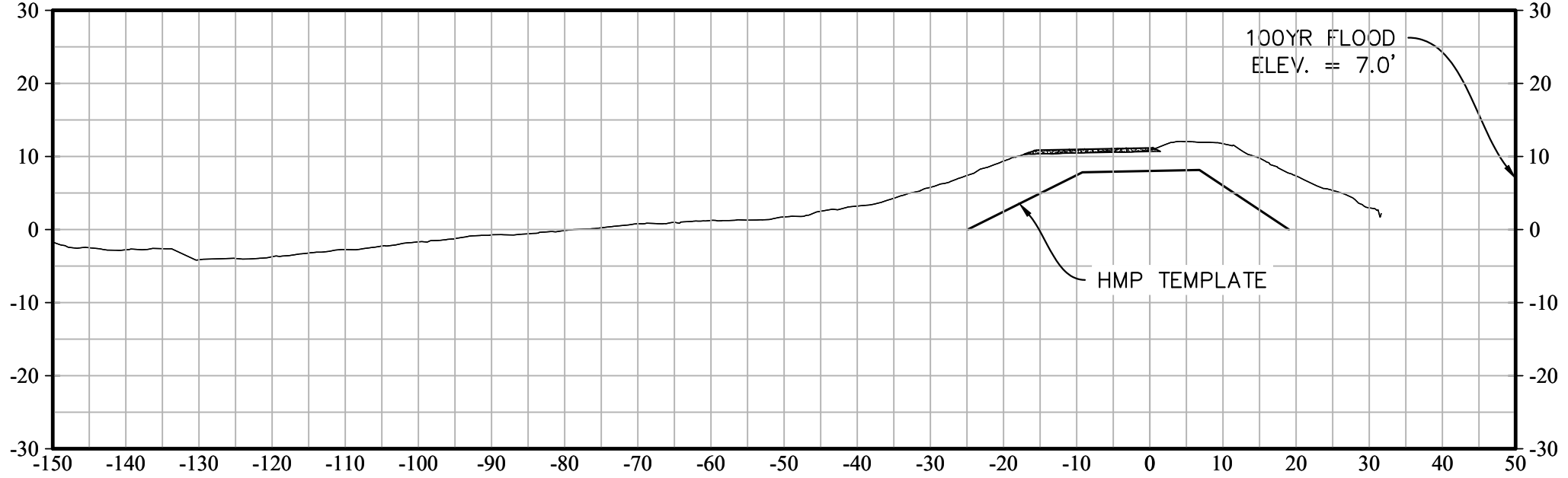

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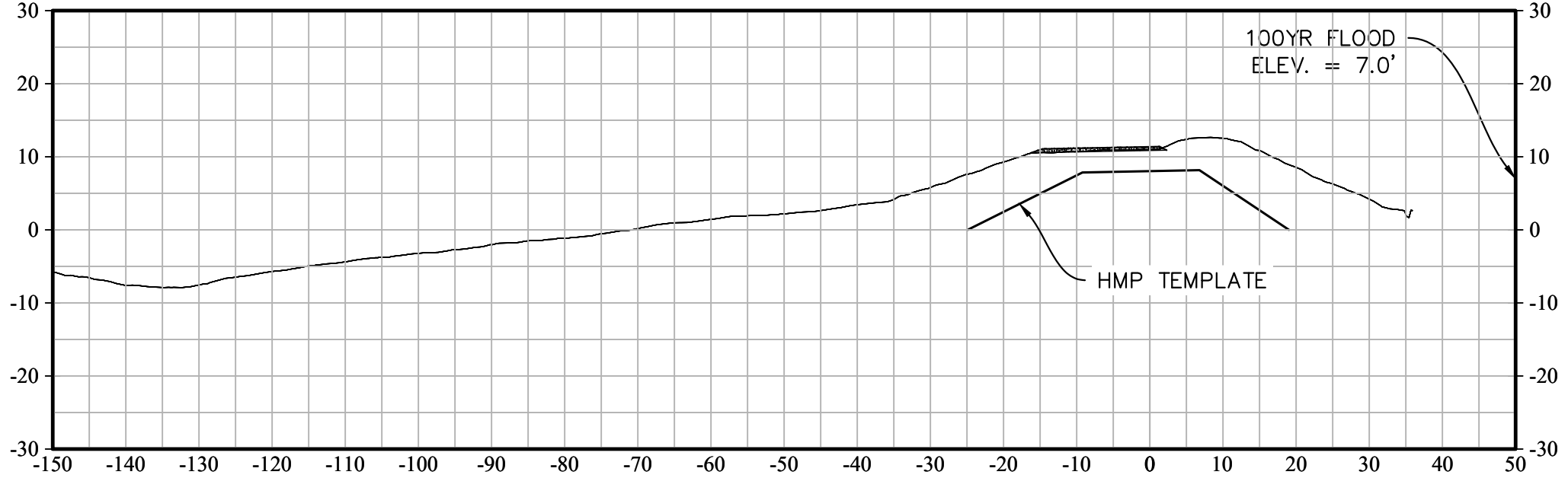
200+00



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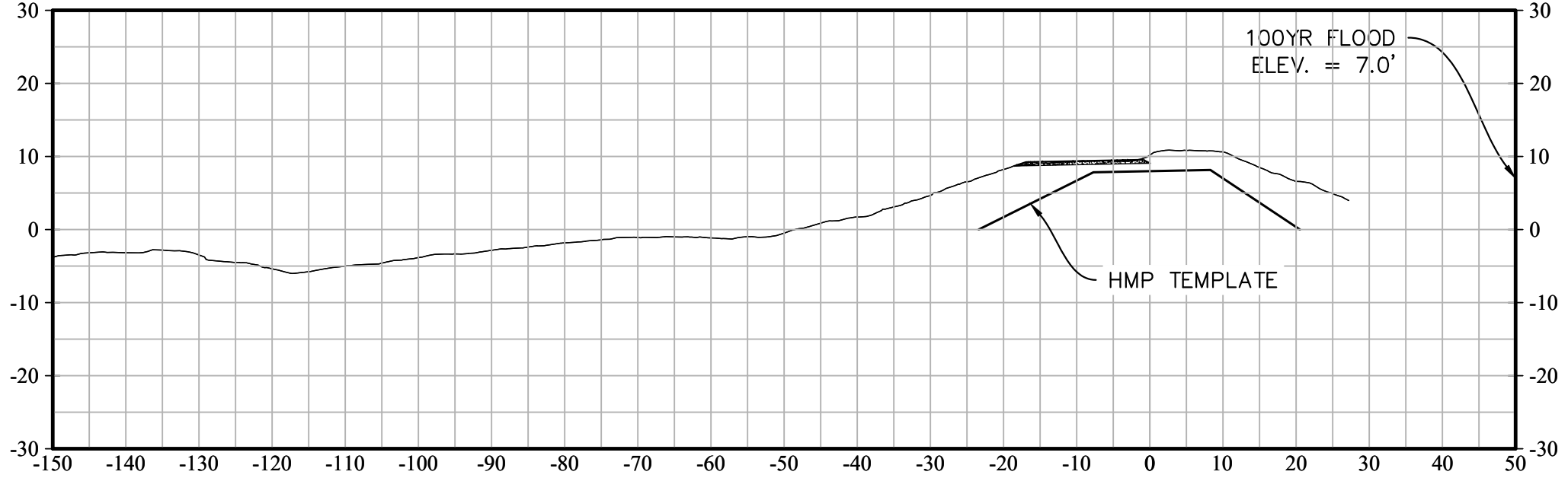

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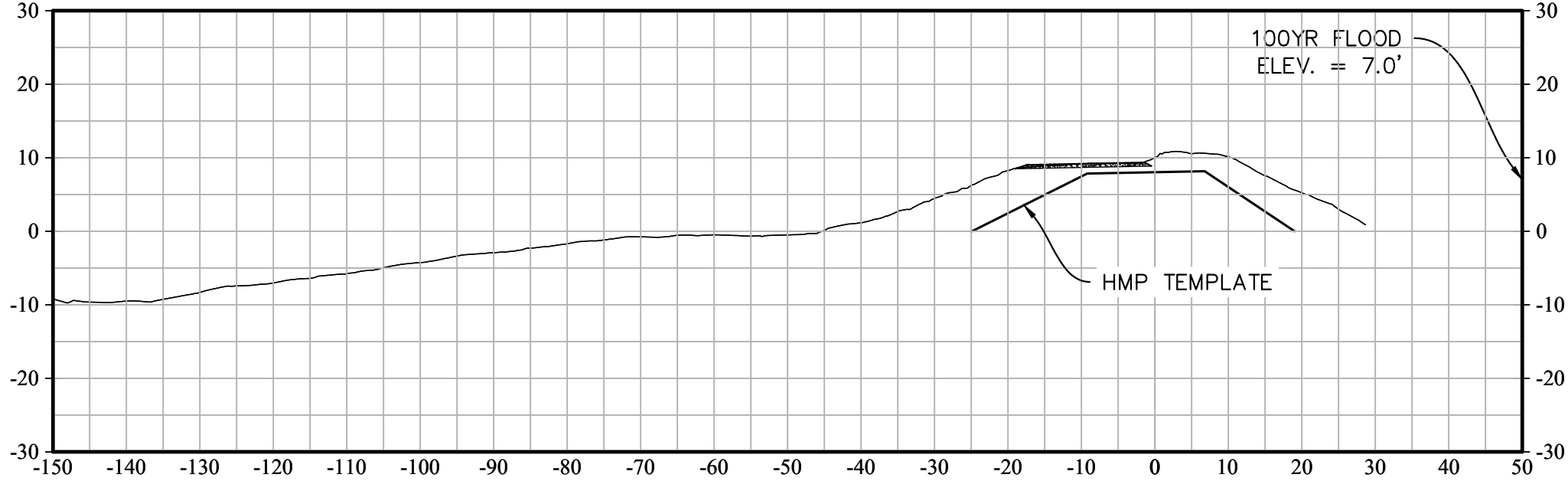
210+00



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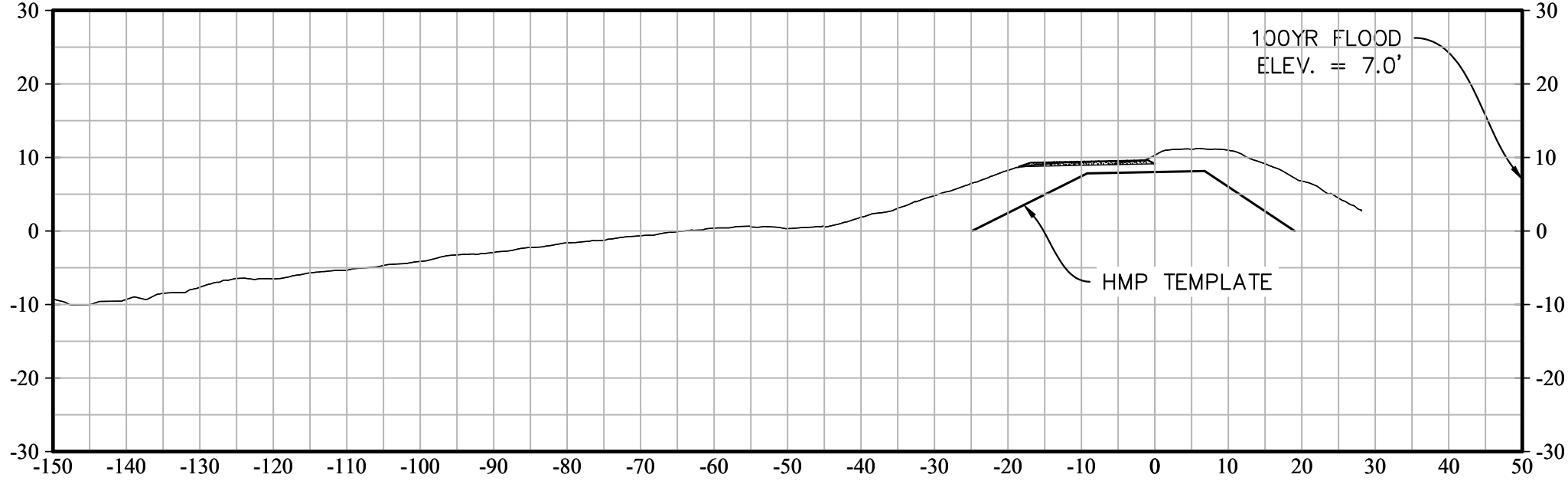

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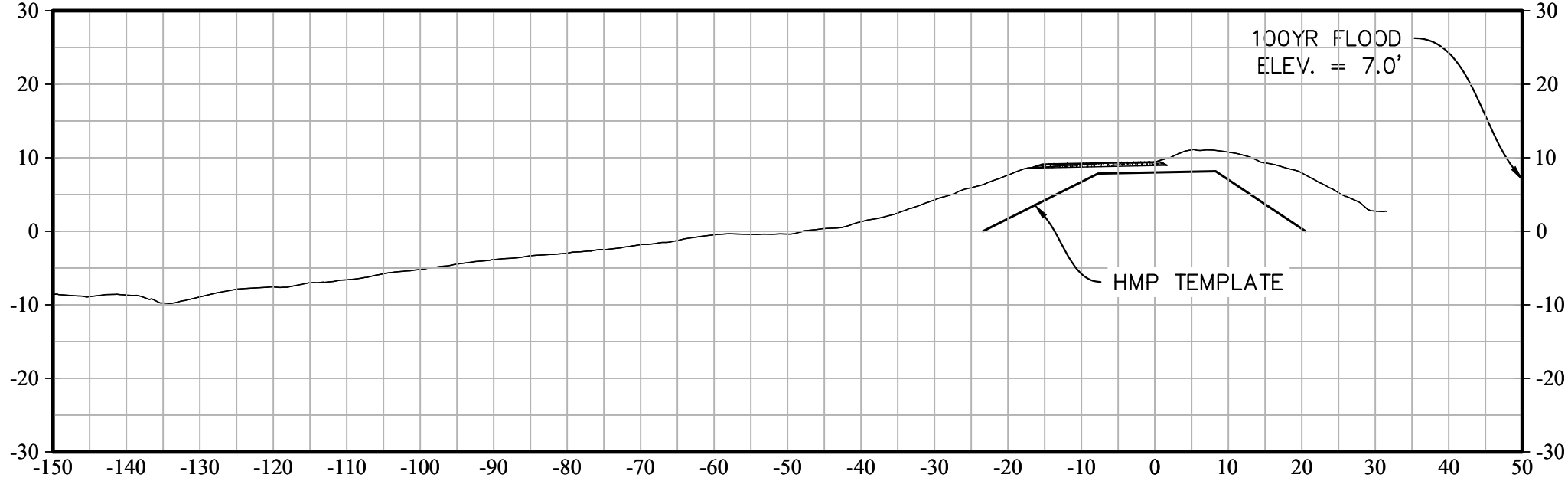

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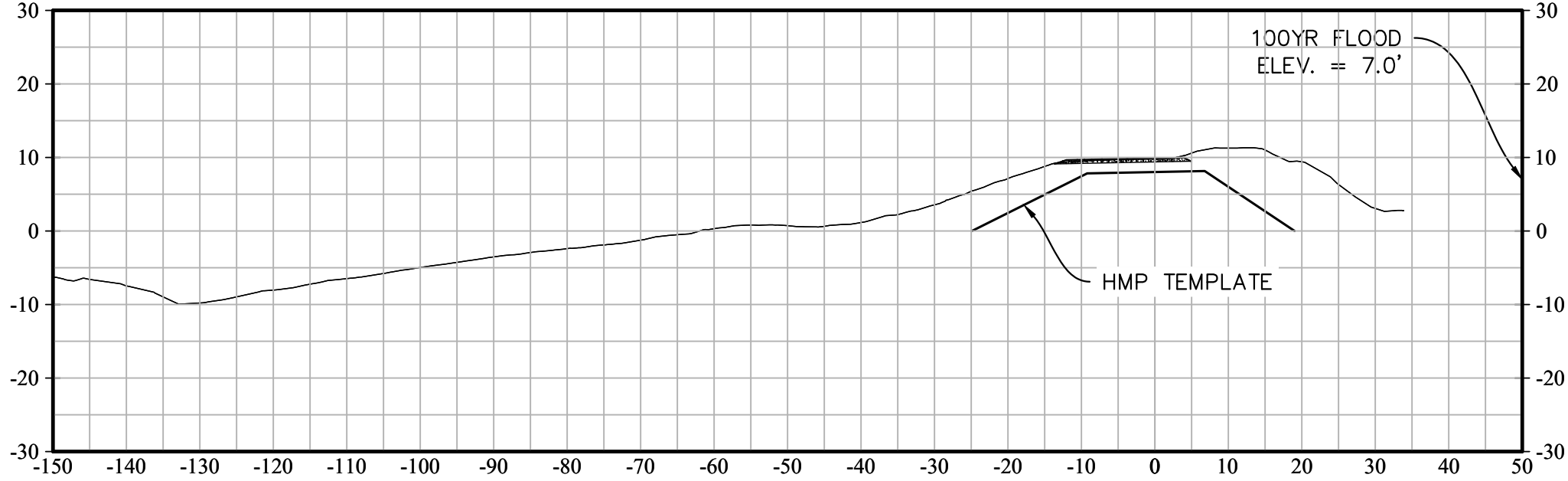

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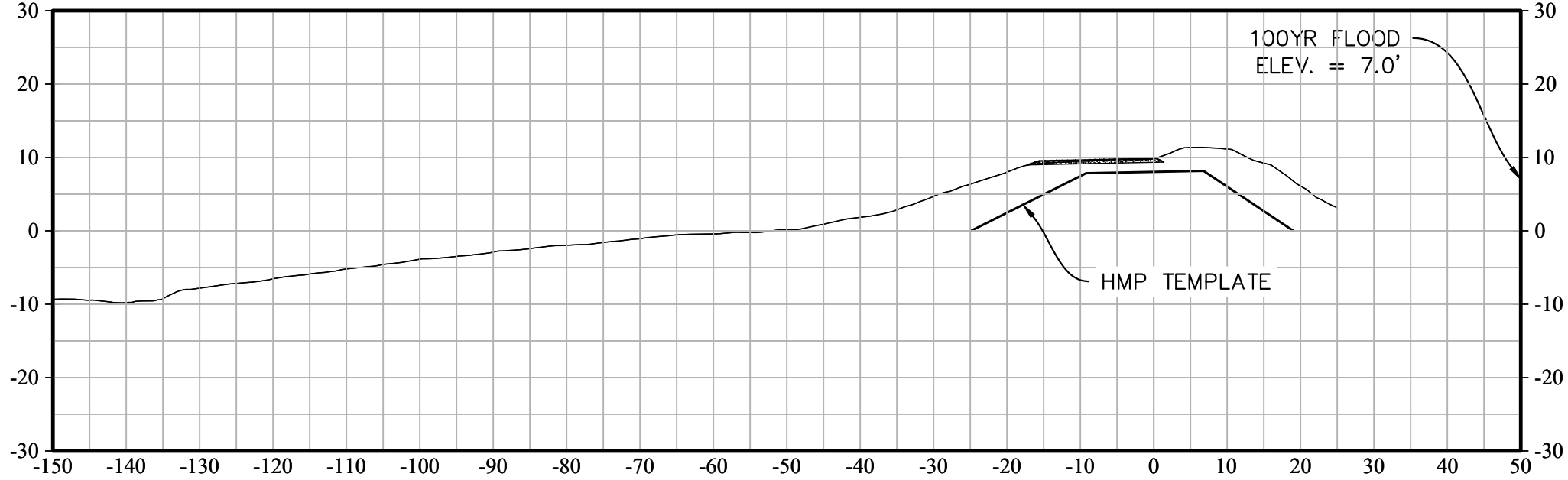
230+00



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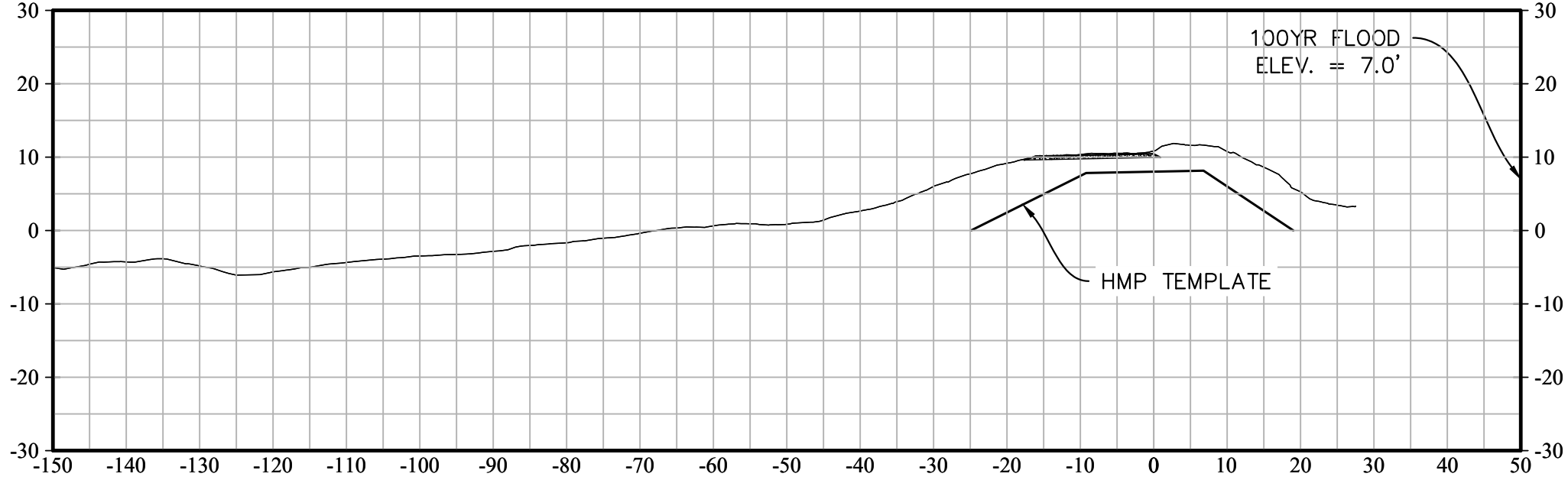

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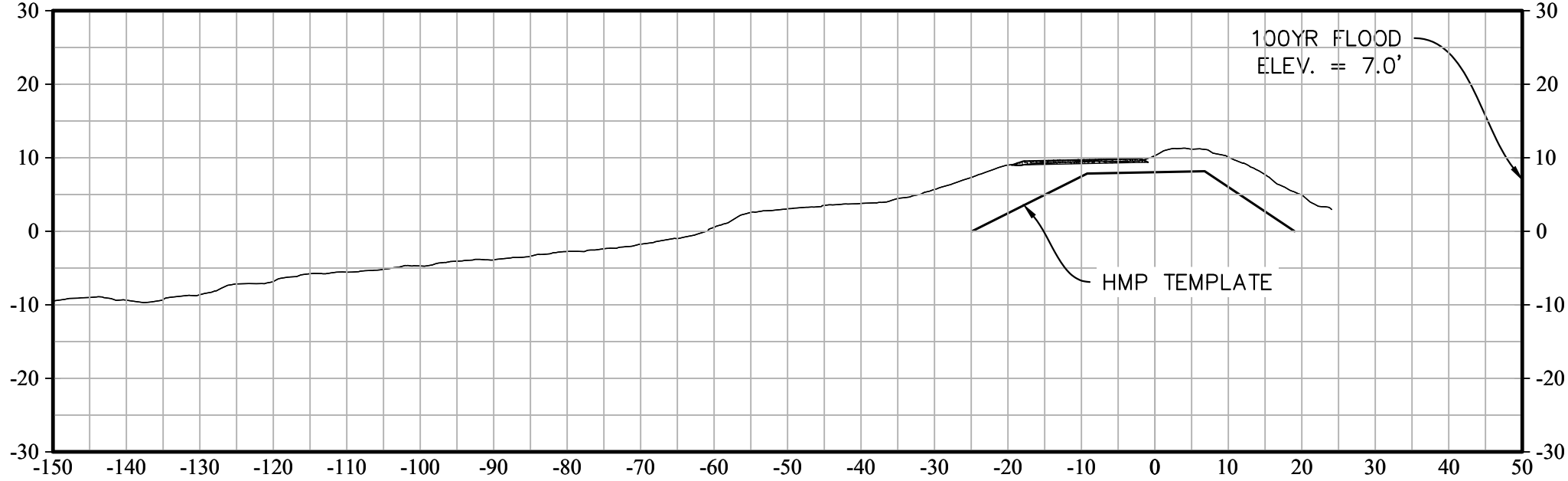
240+00



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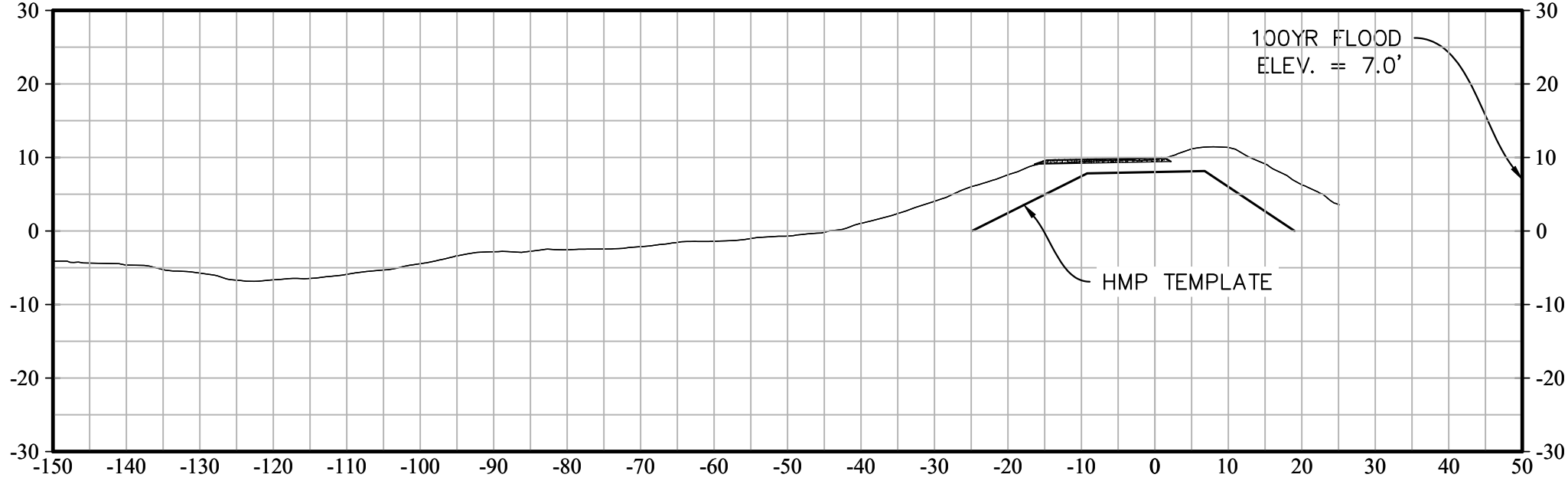

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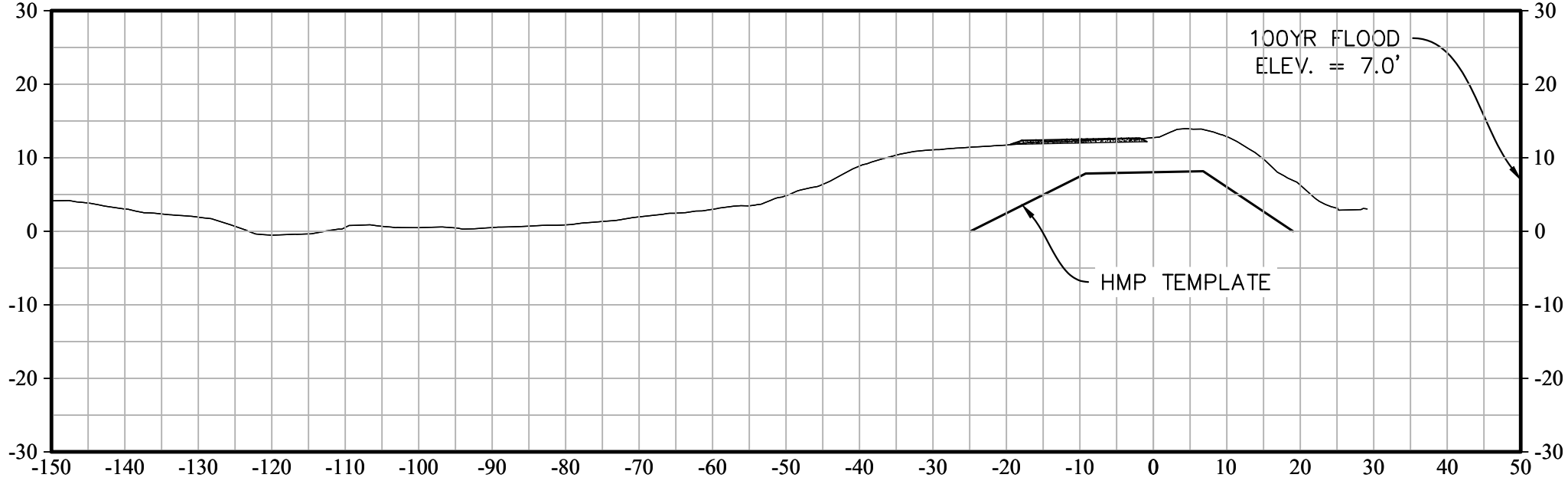
250+00



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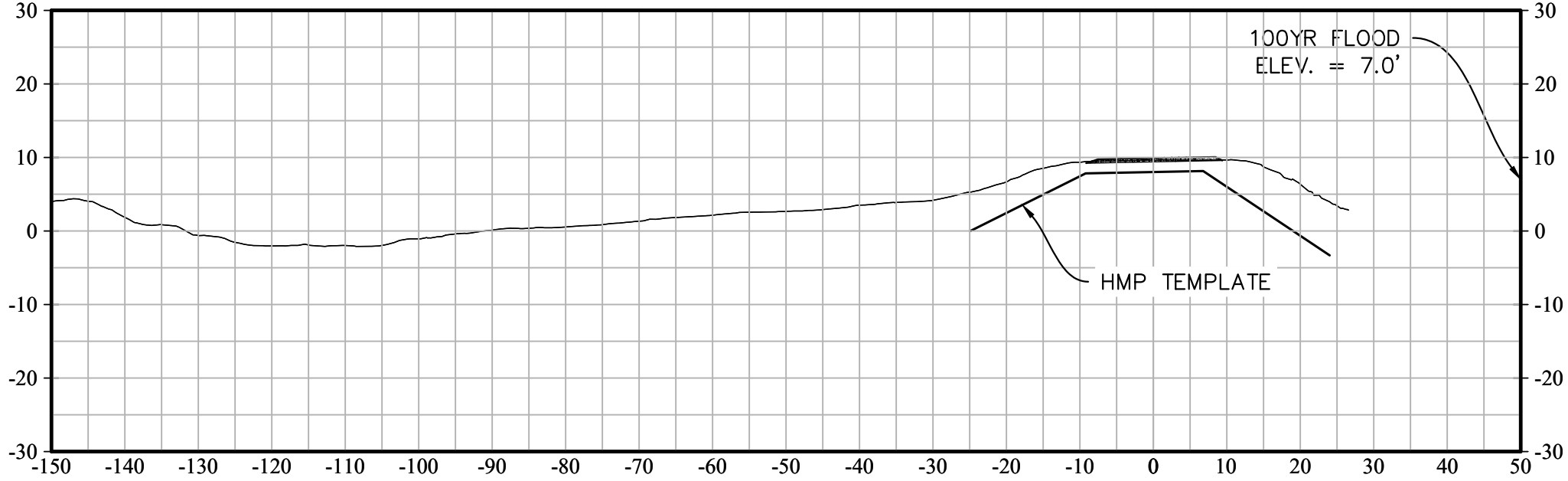

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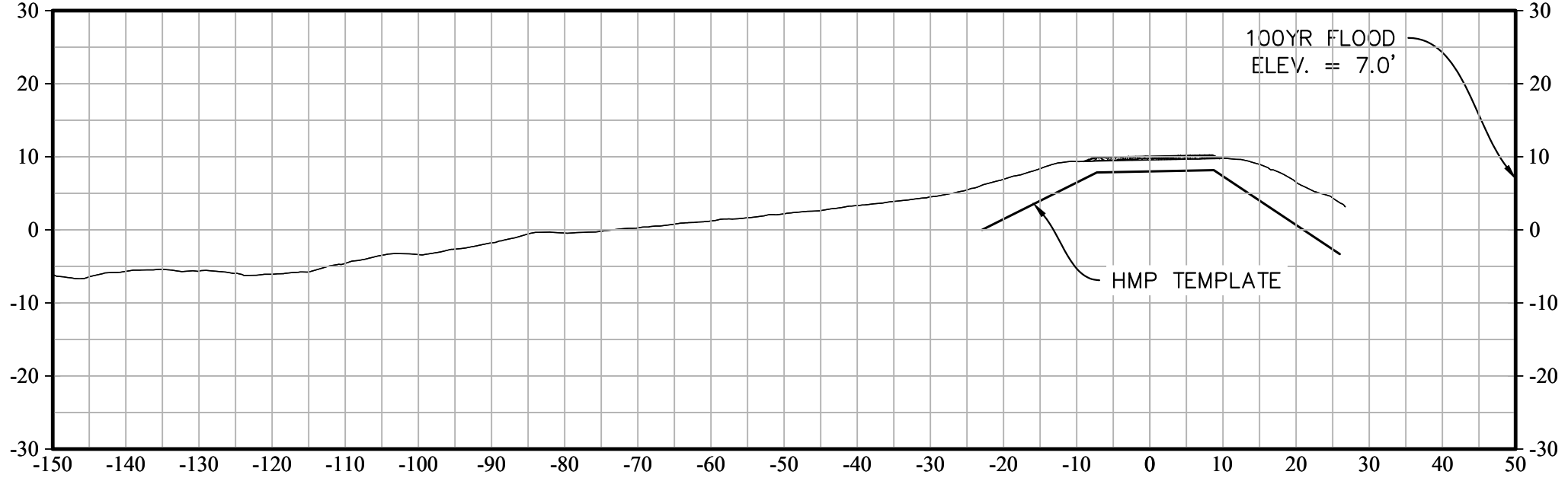
260+00



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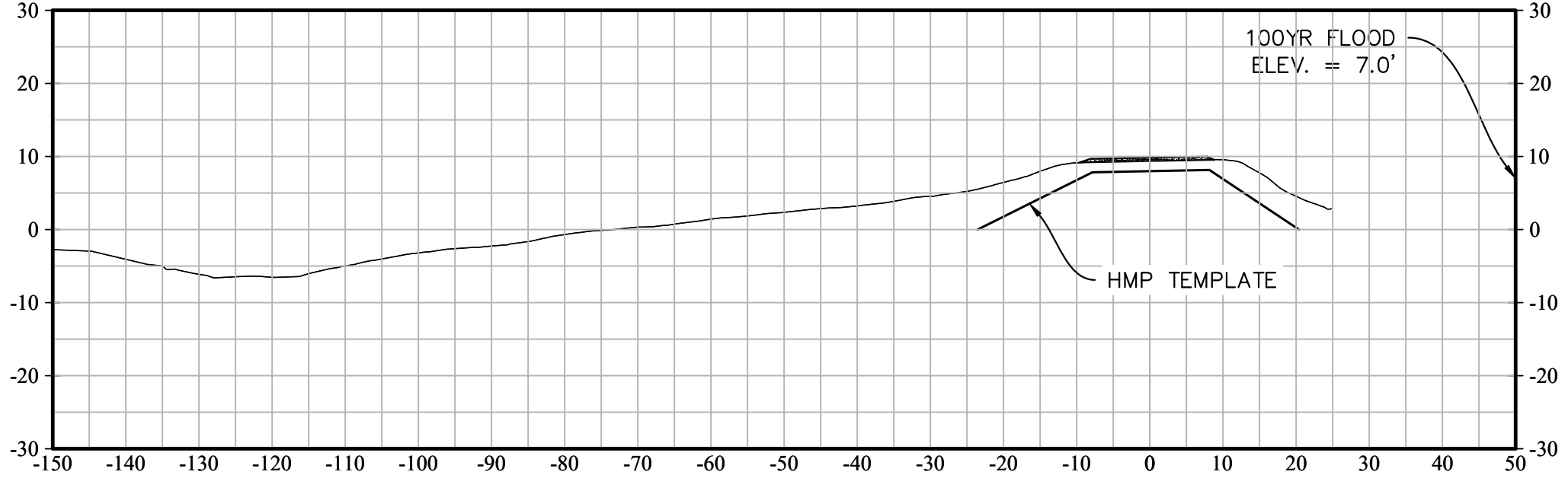

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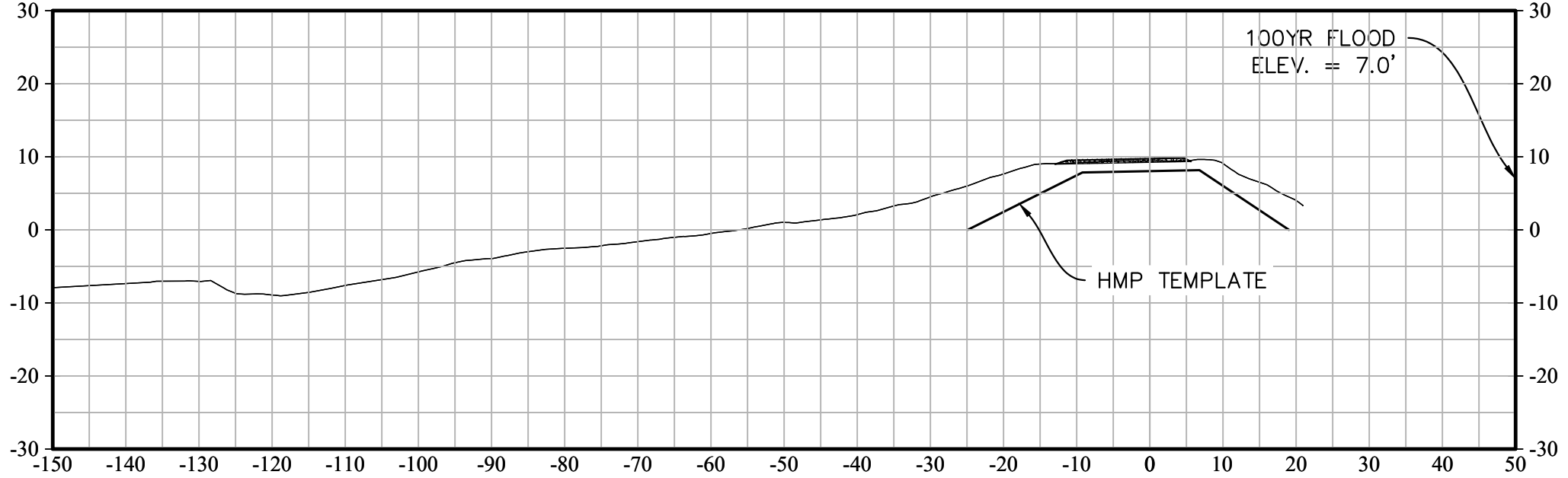
270+00



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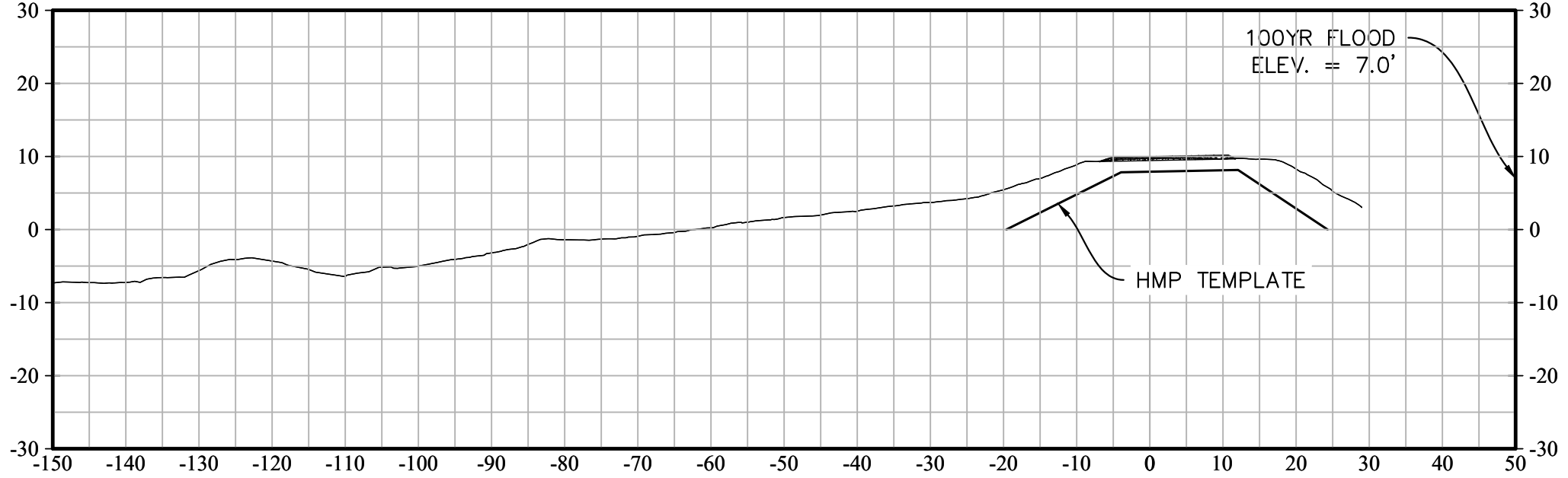

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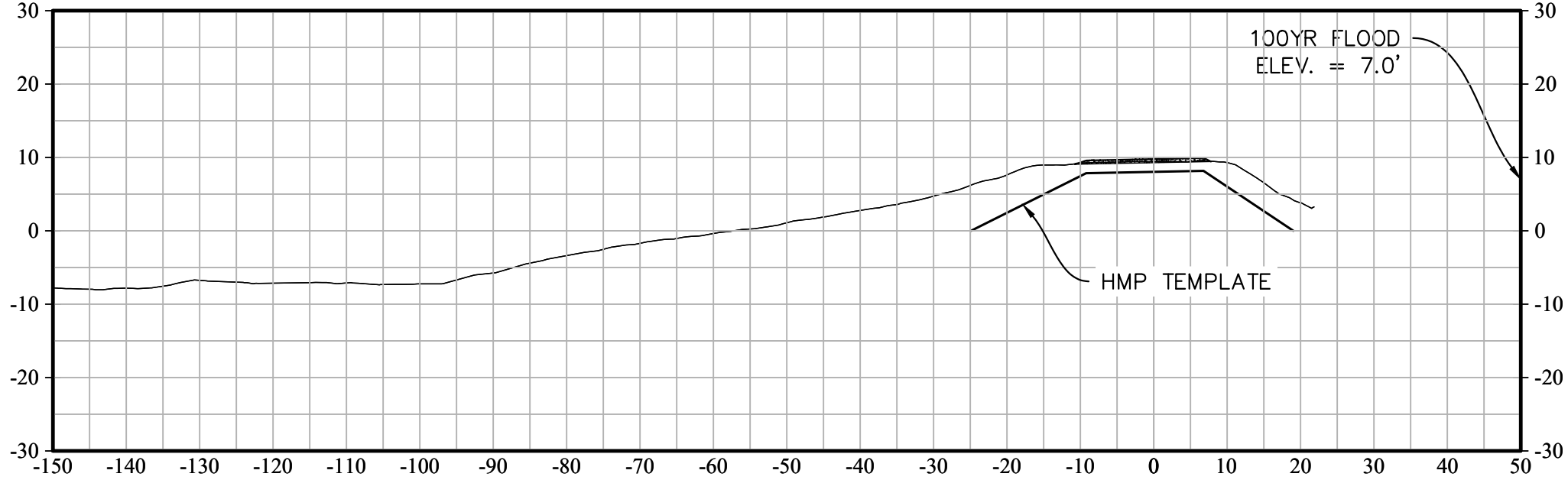

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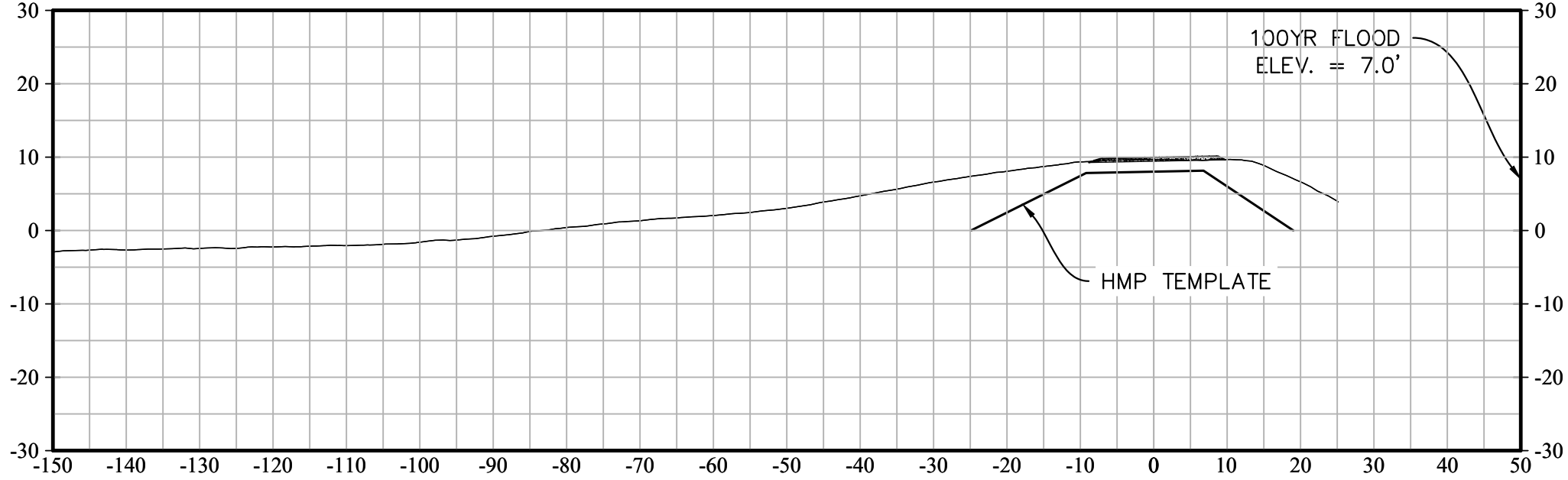

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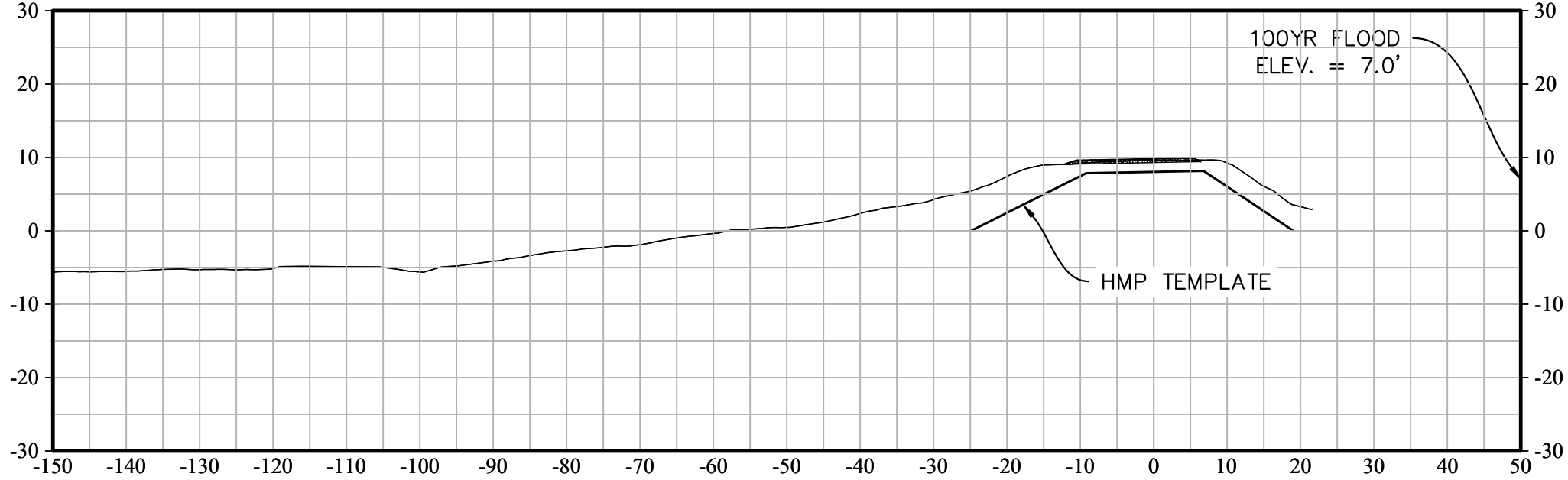

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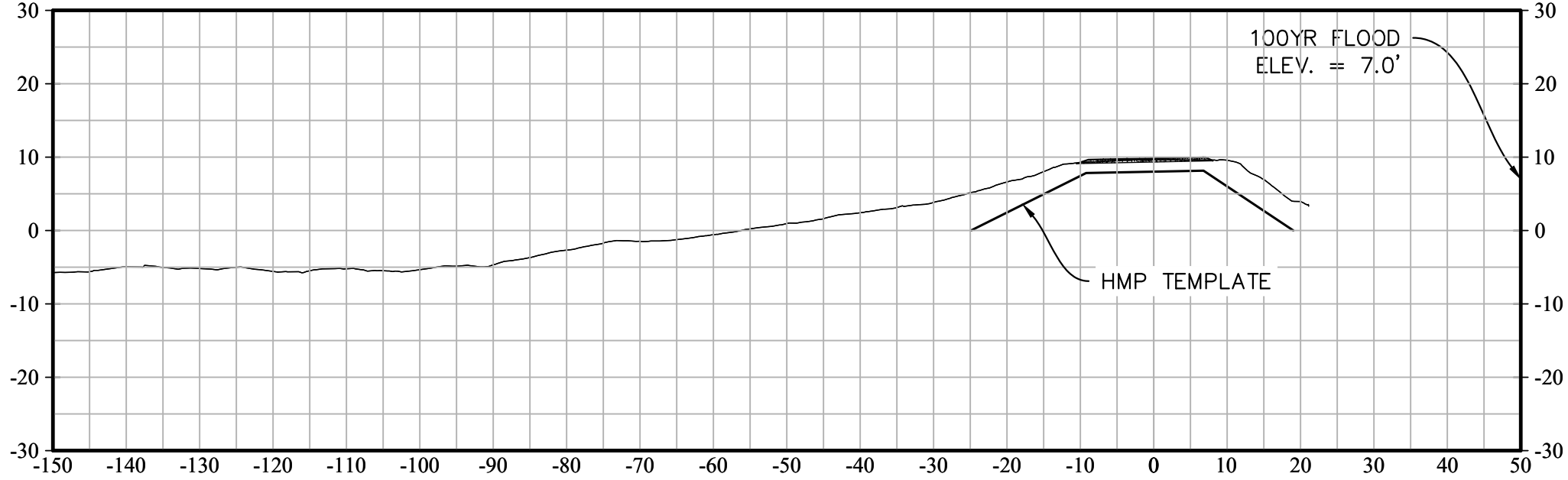

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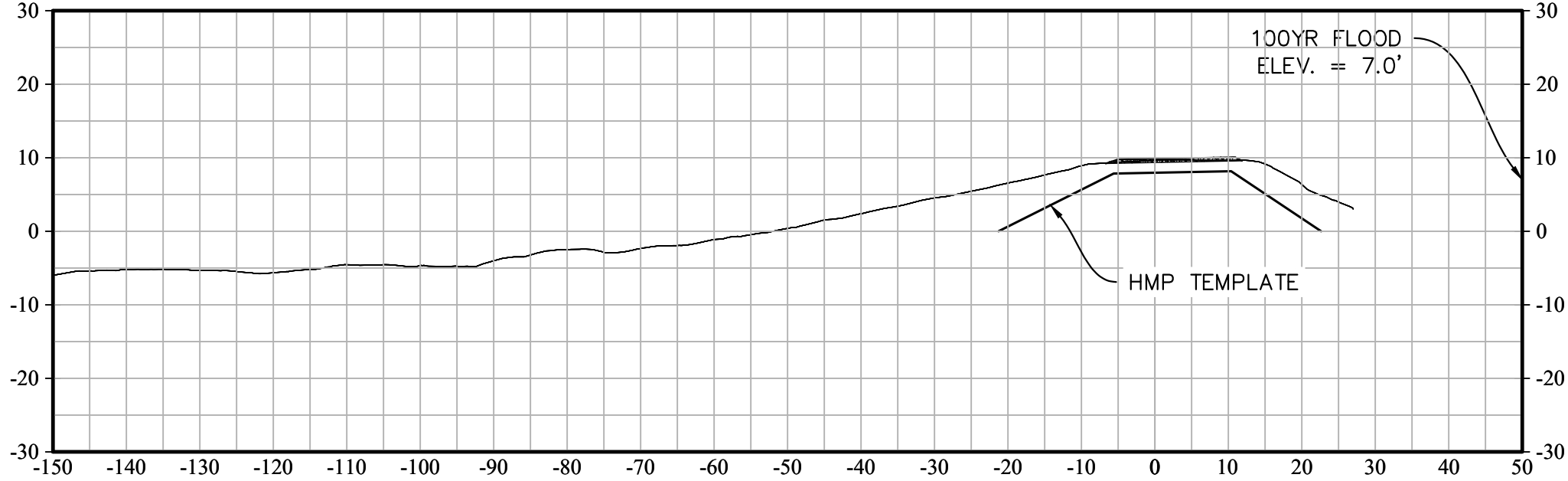
300+00



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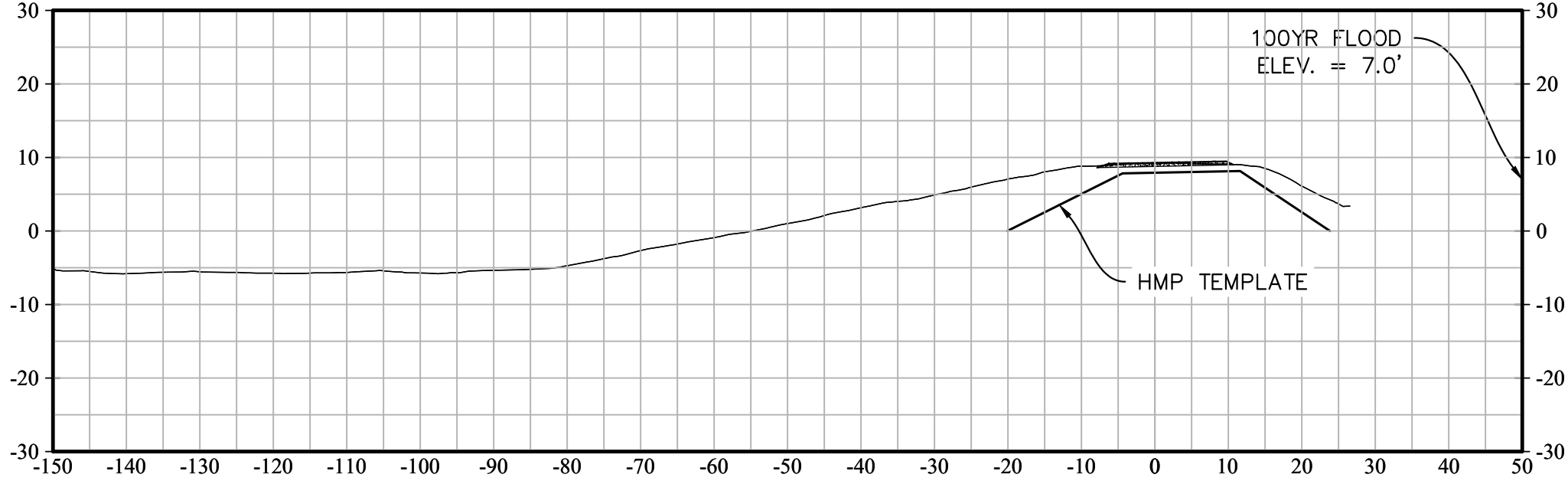

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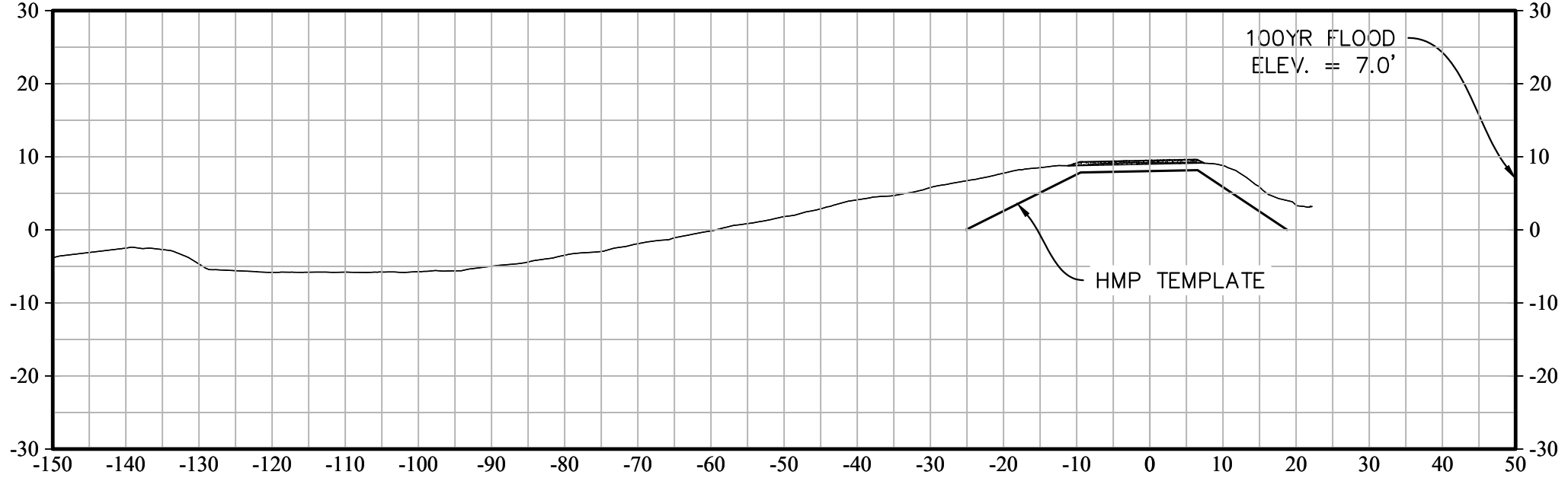

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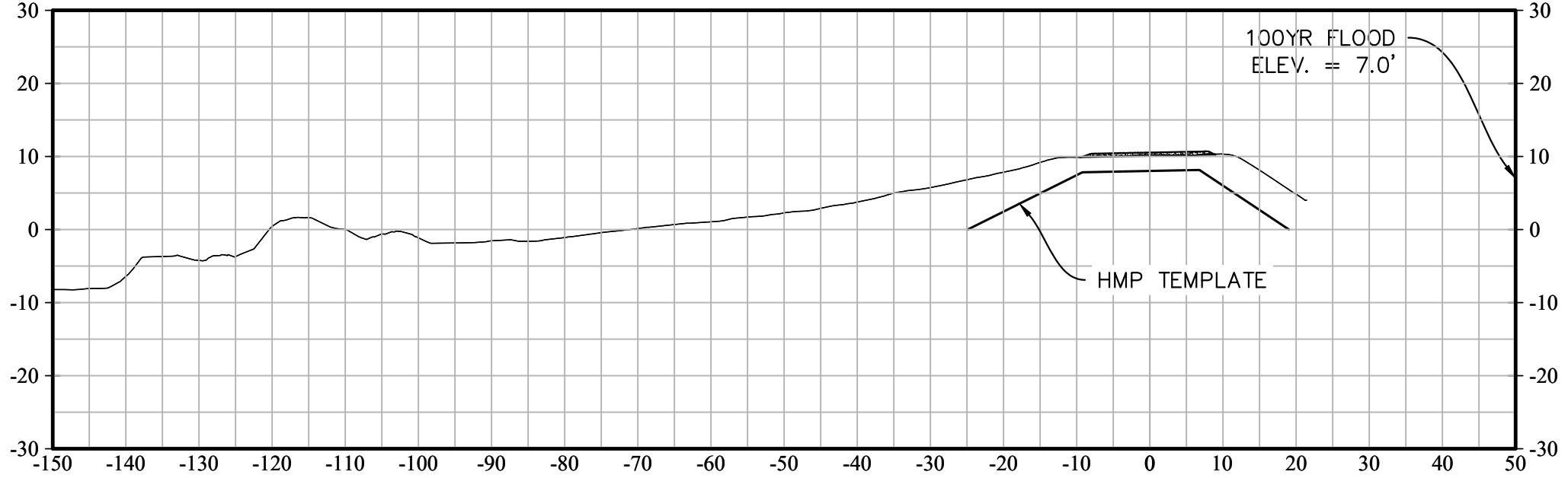

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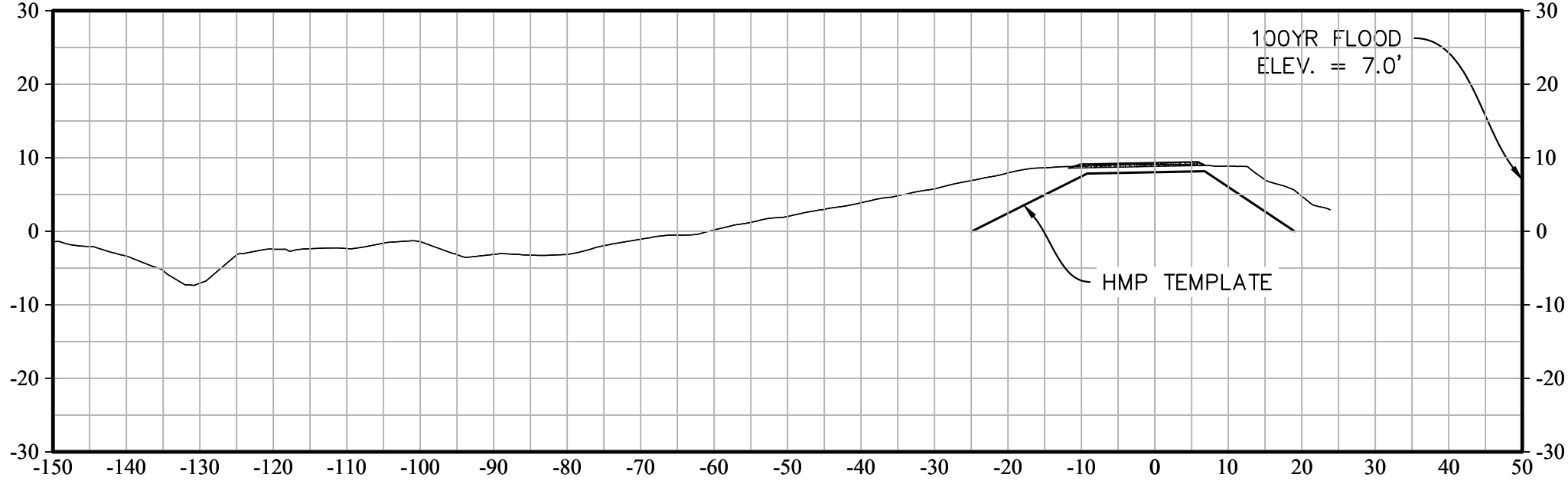

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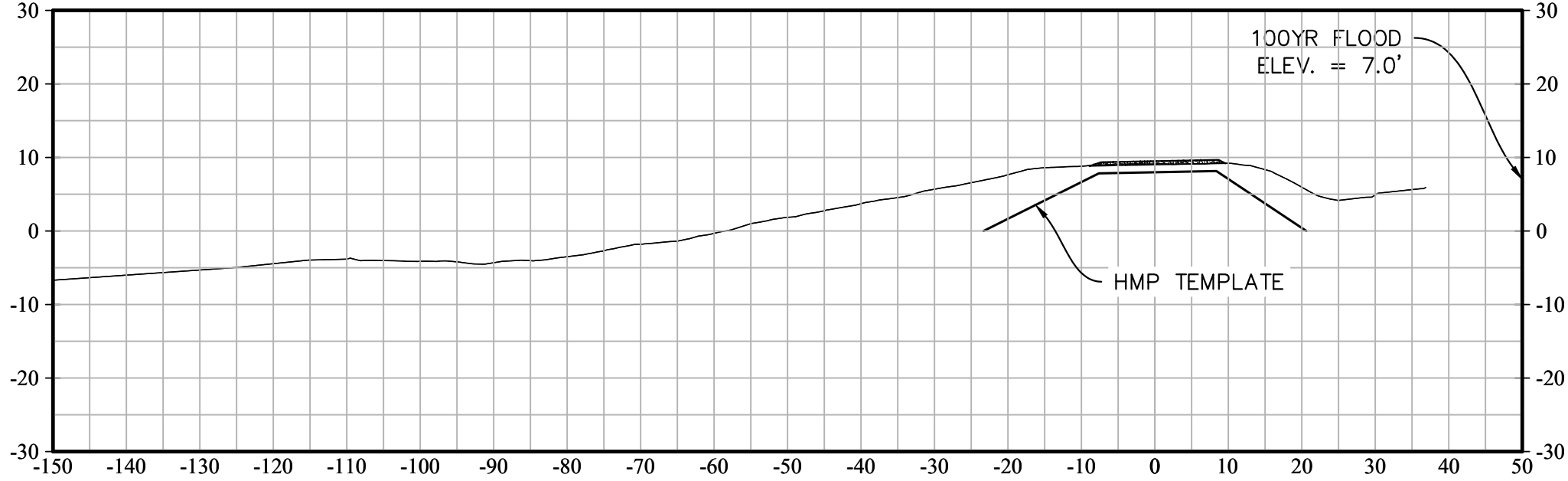

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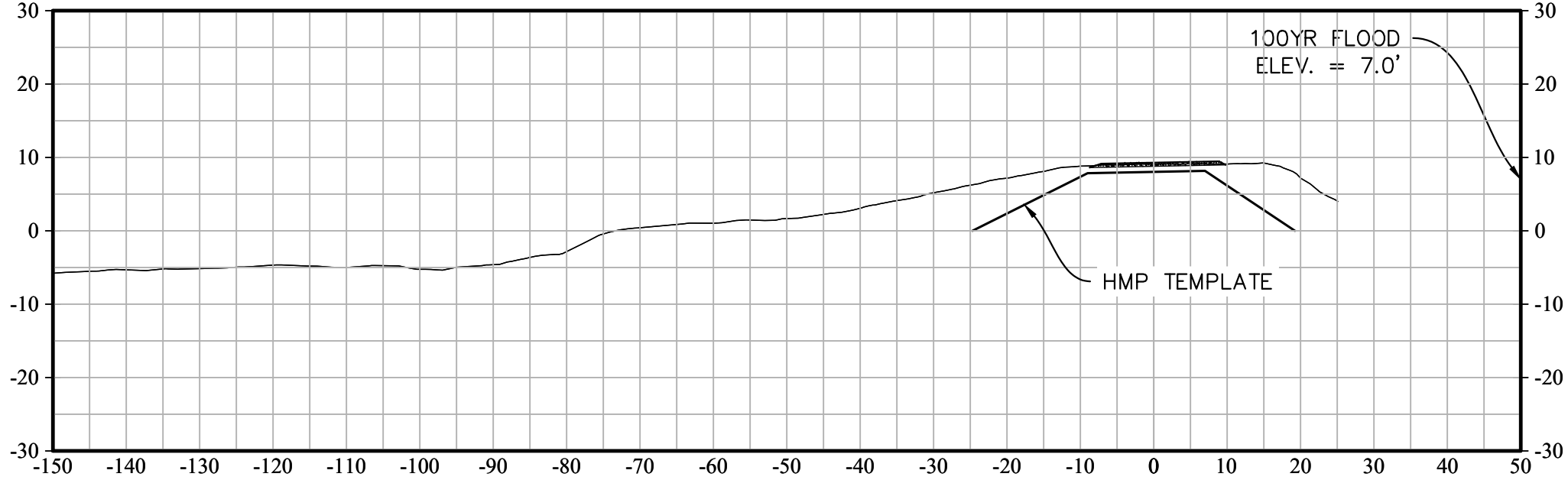

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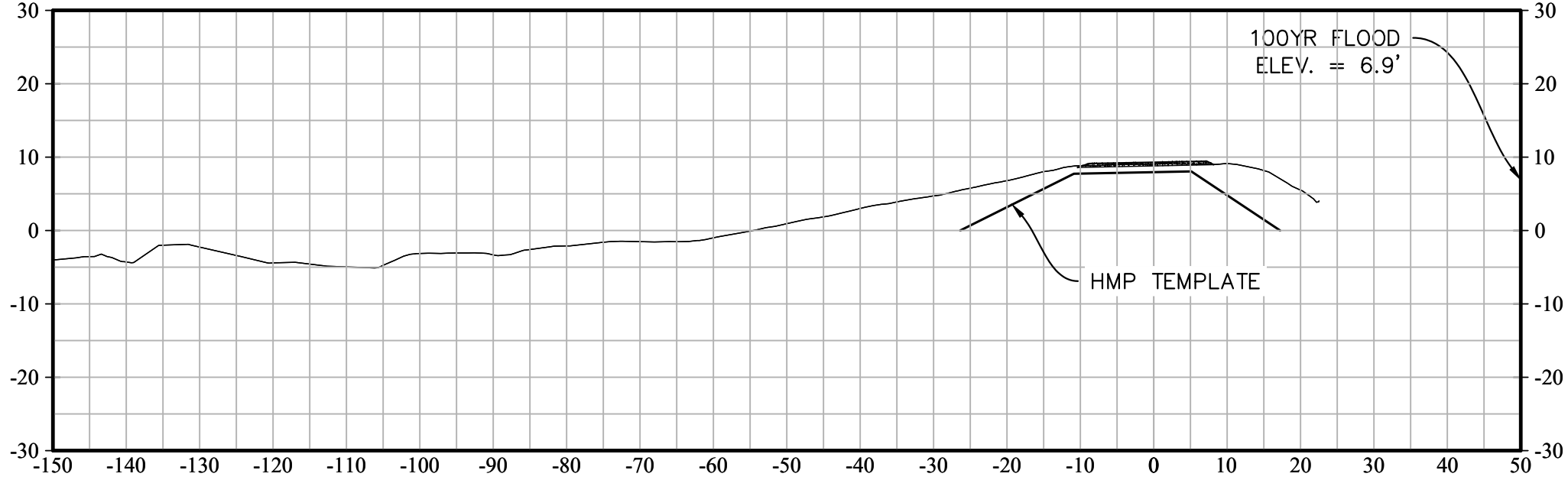

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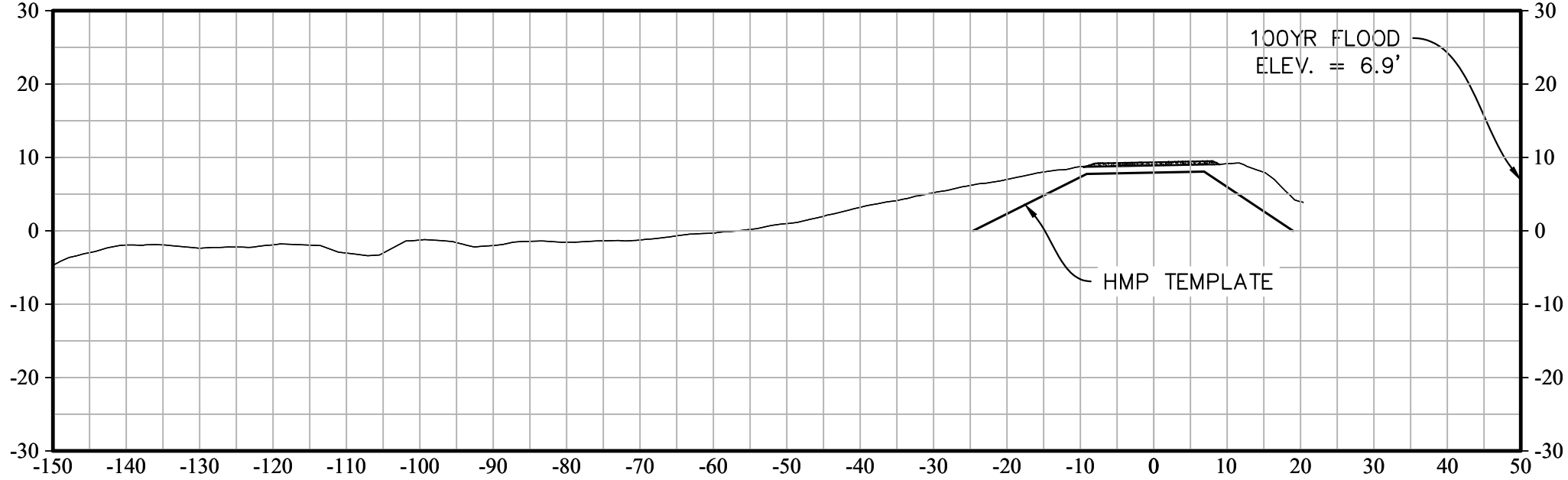
340+00



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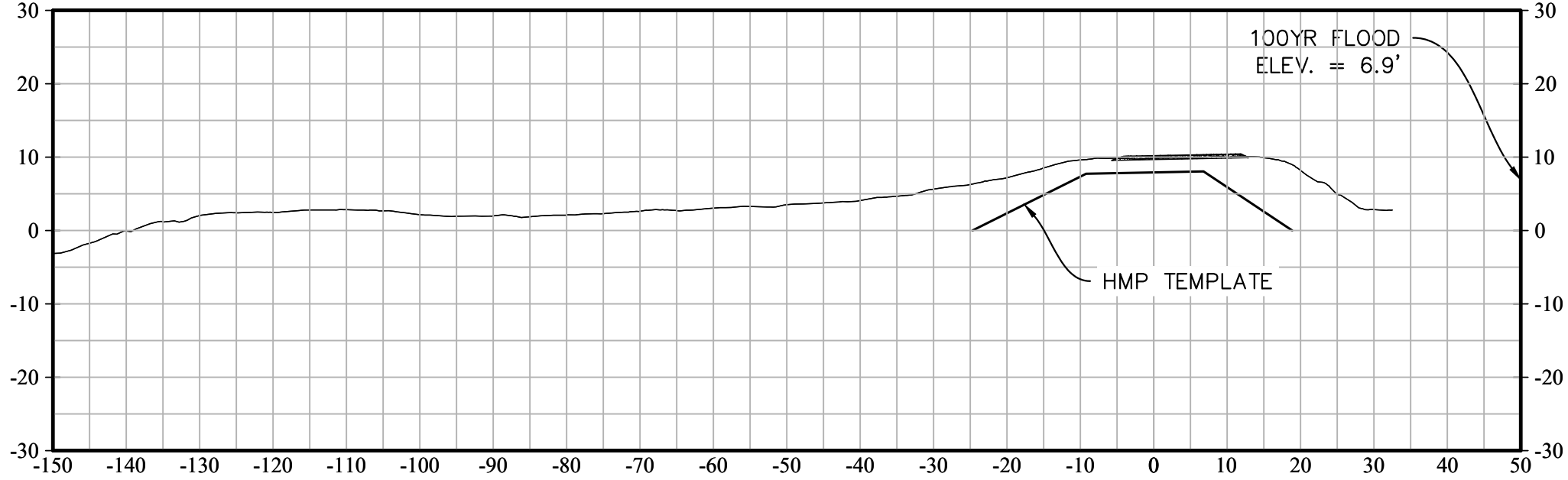

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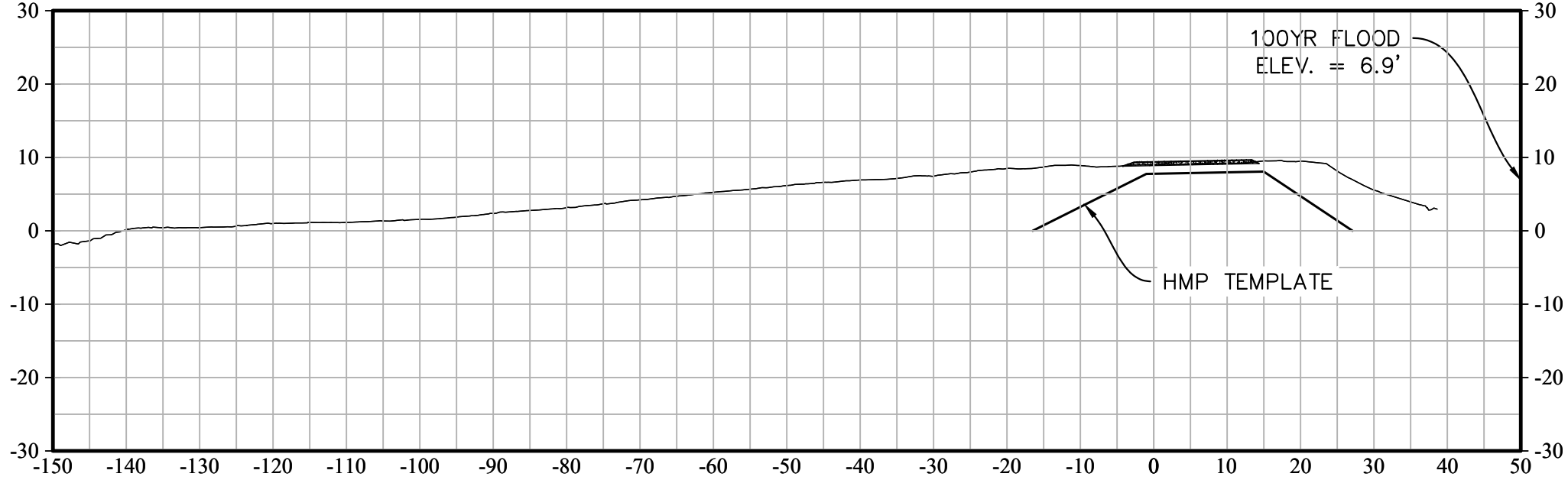

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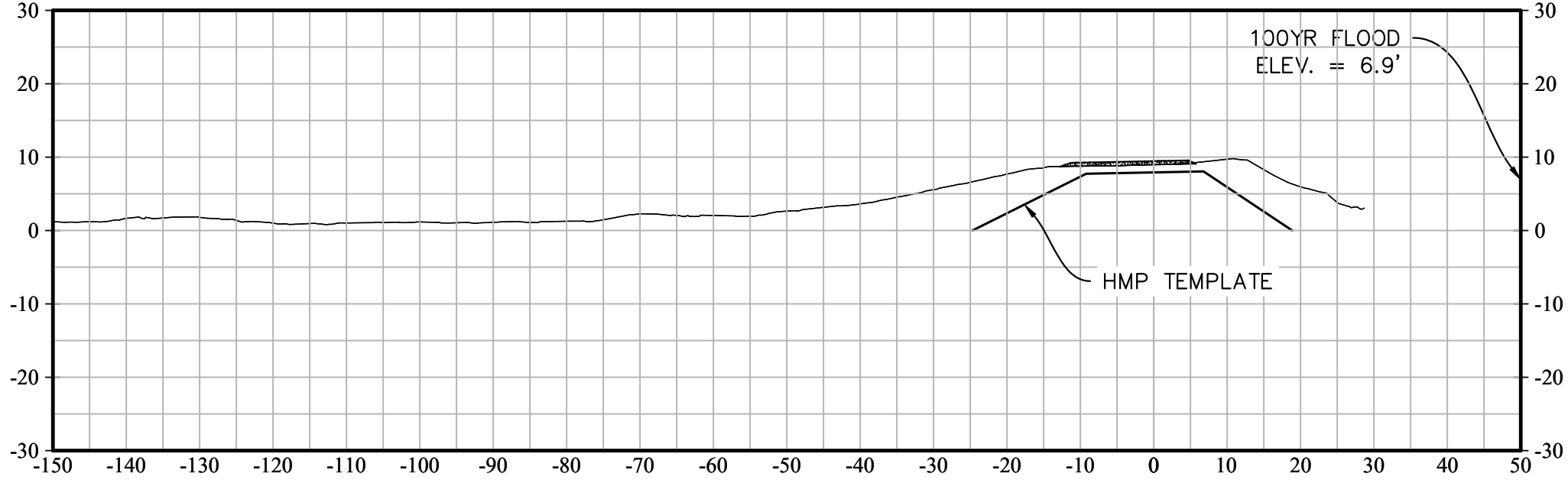

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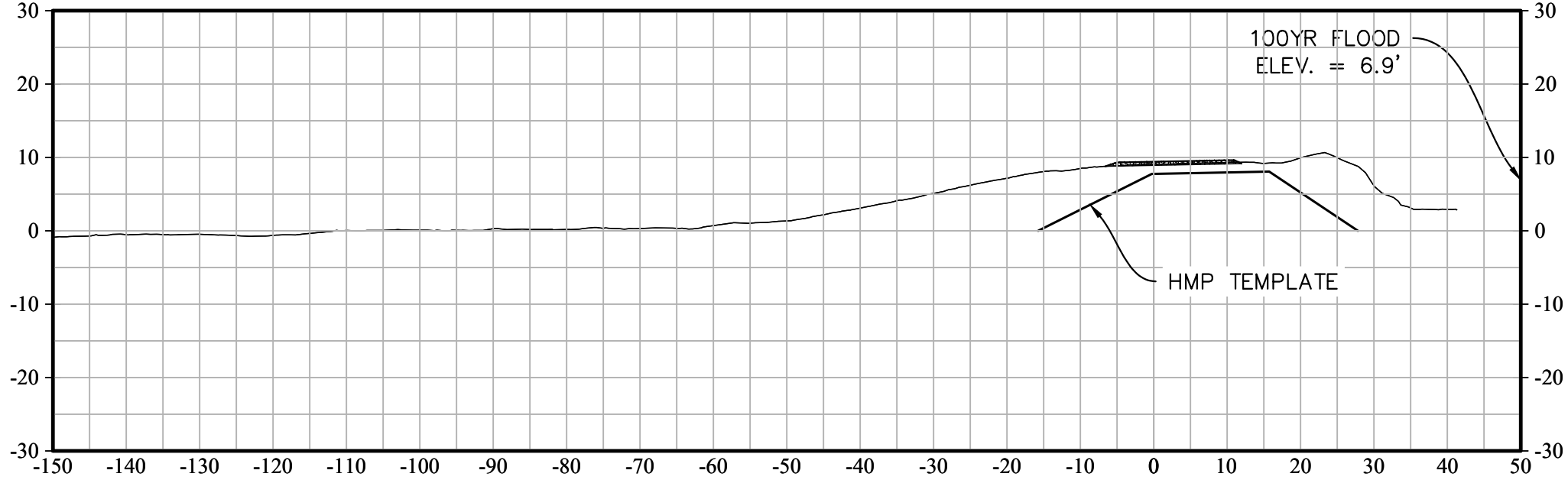

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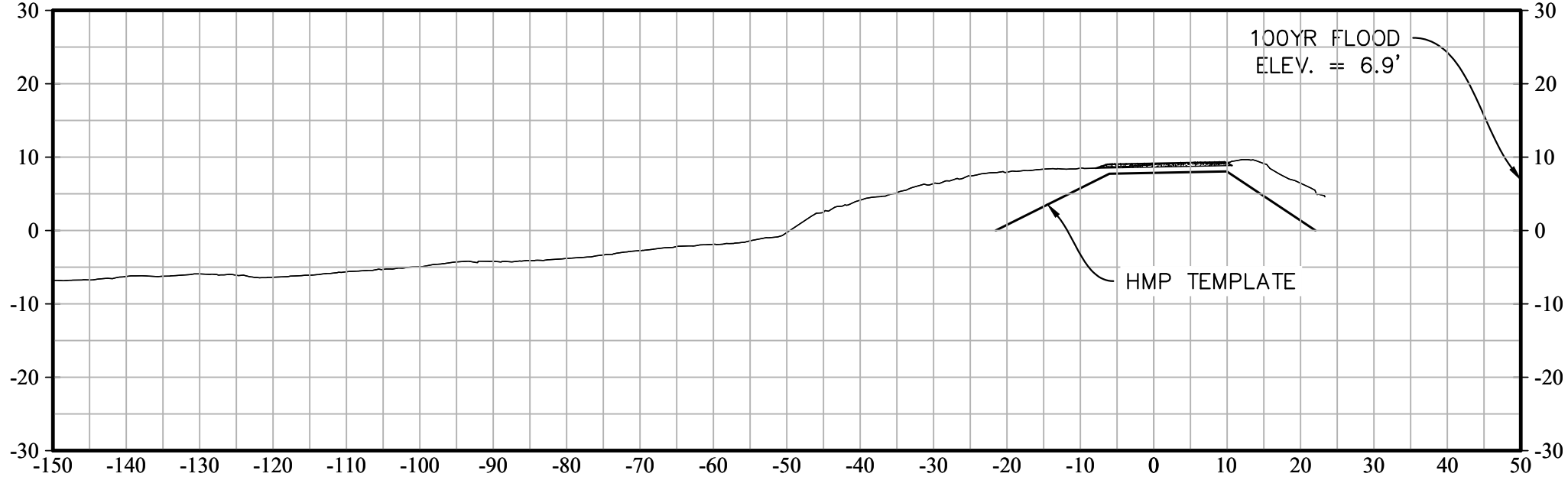

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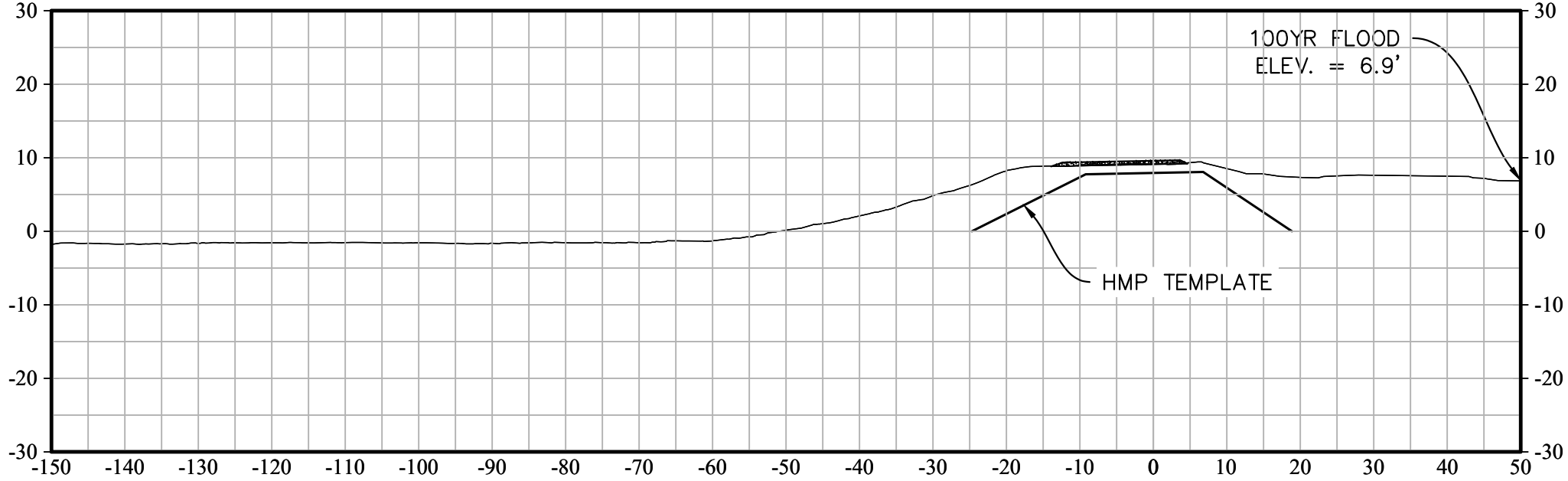

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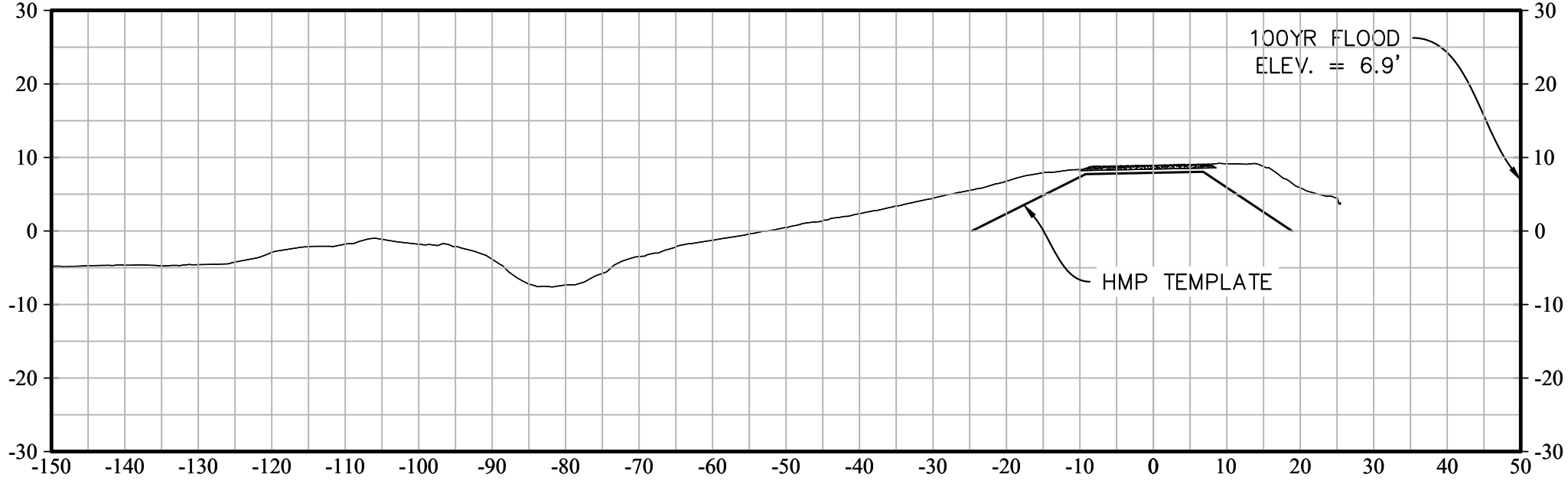

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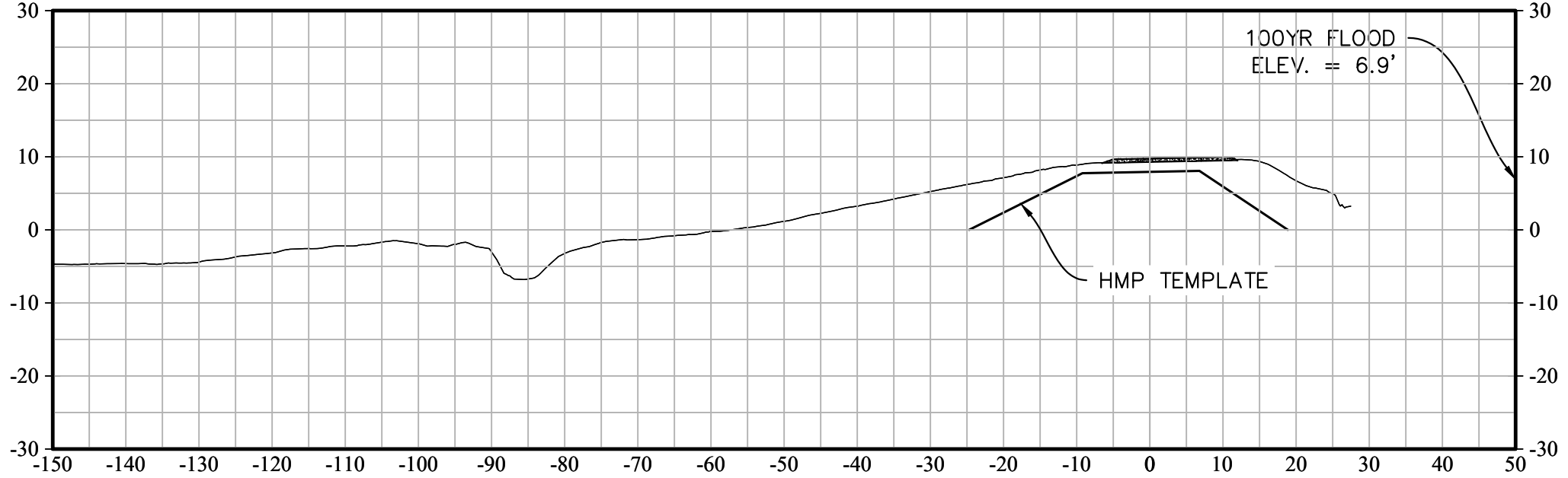

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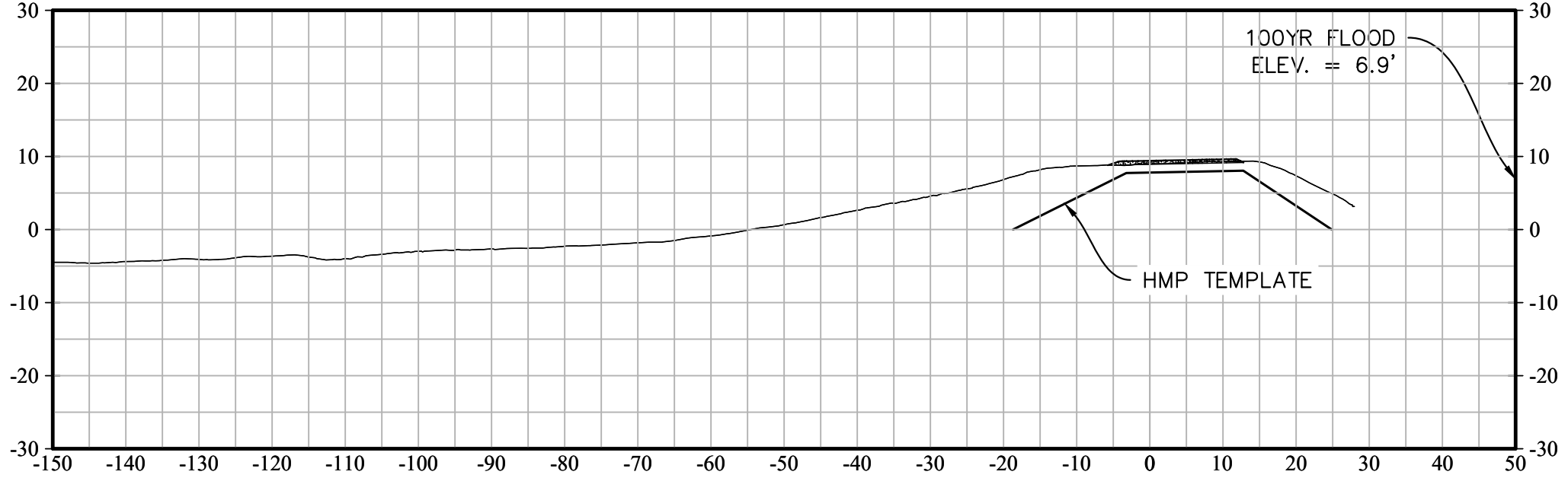

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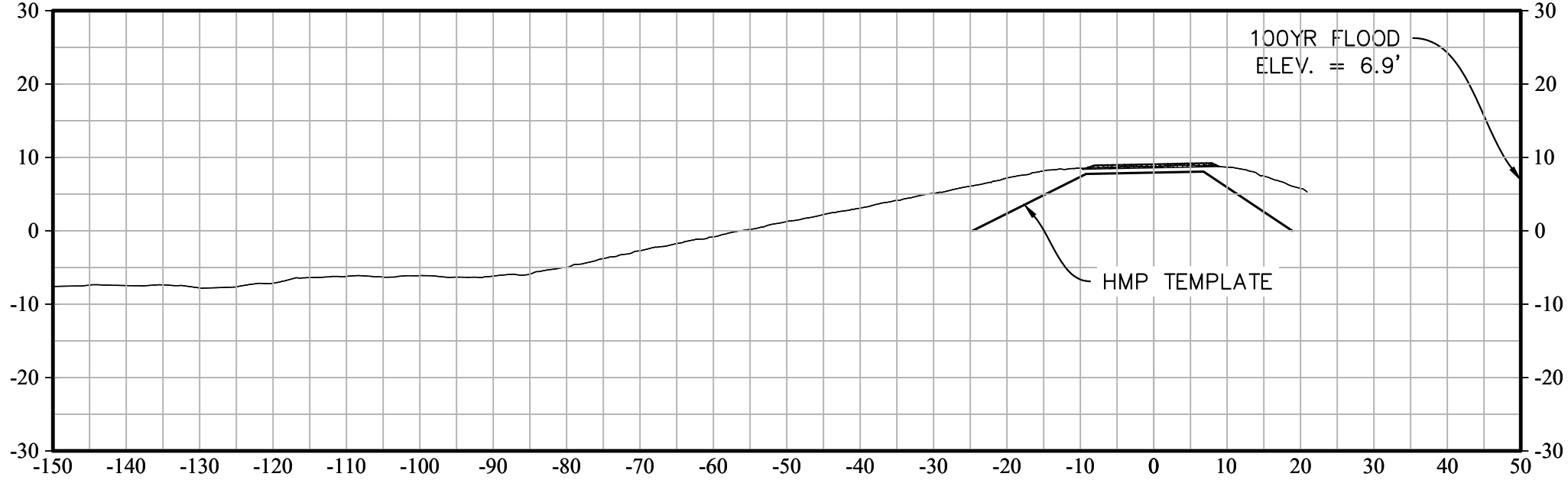
390+00



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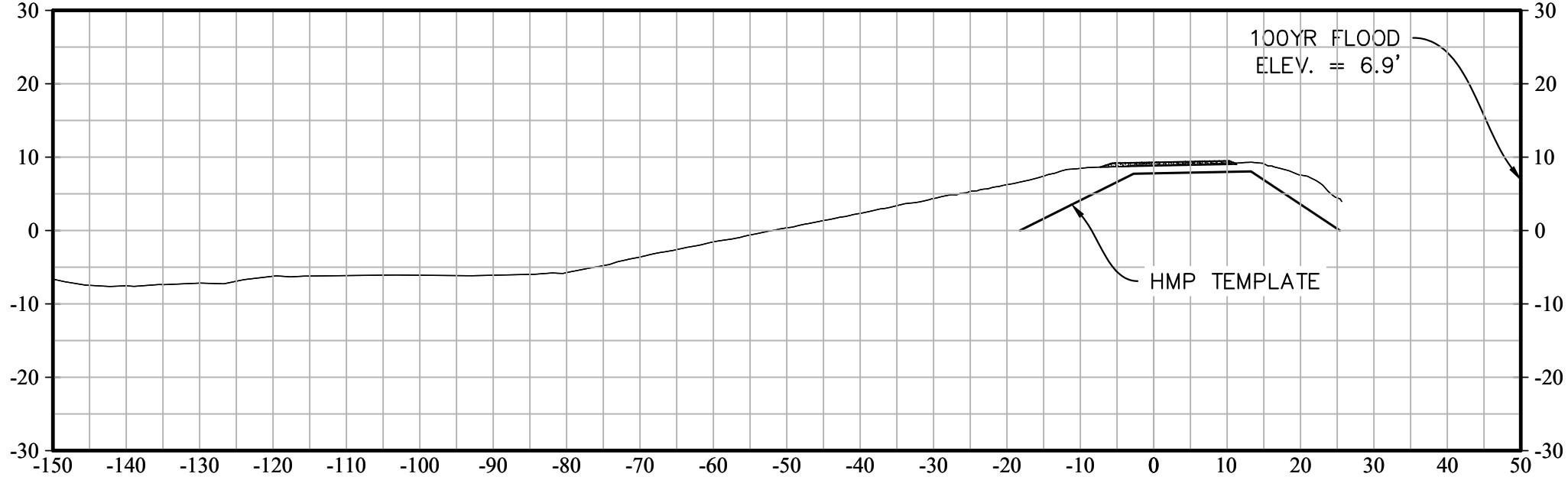

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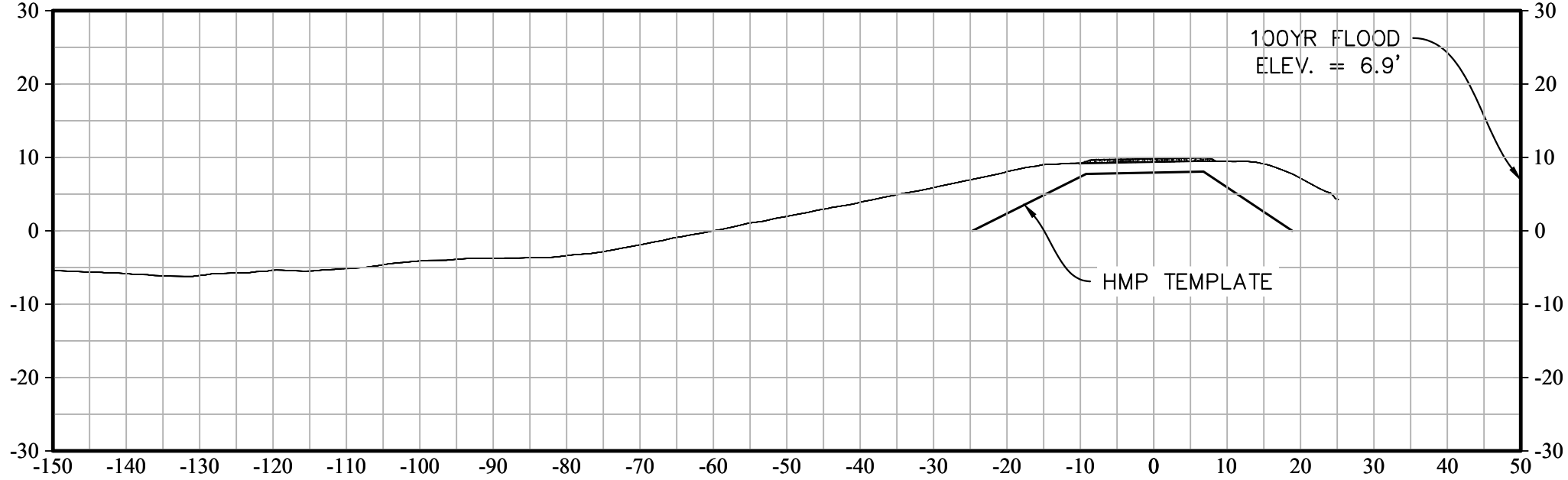

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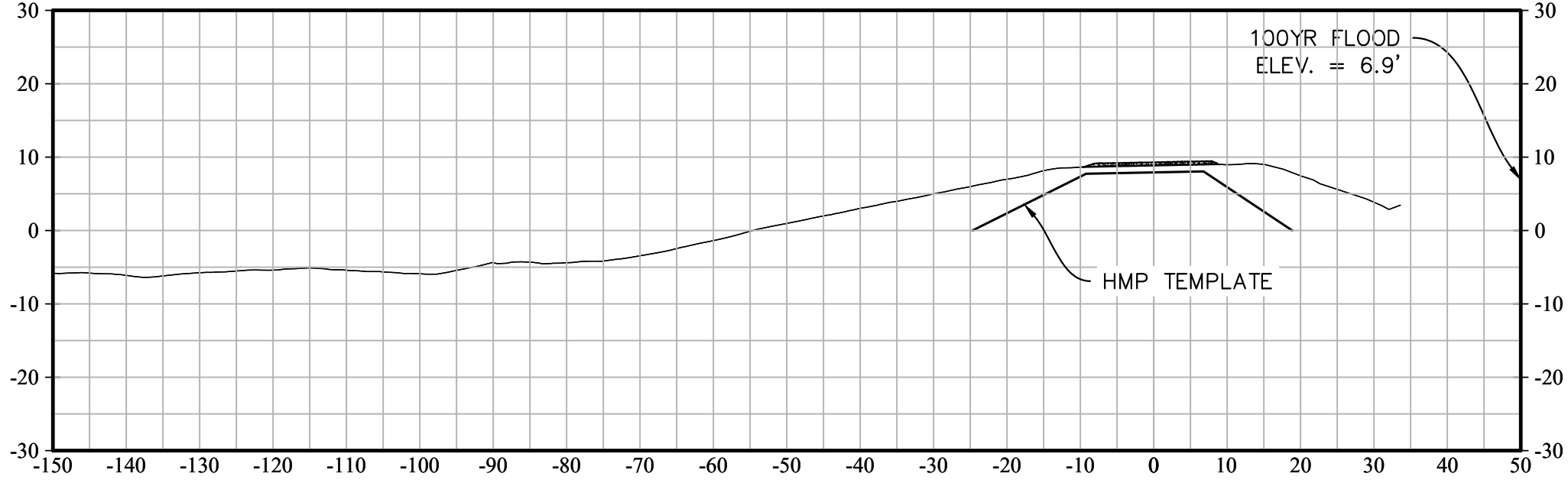

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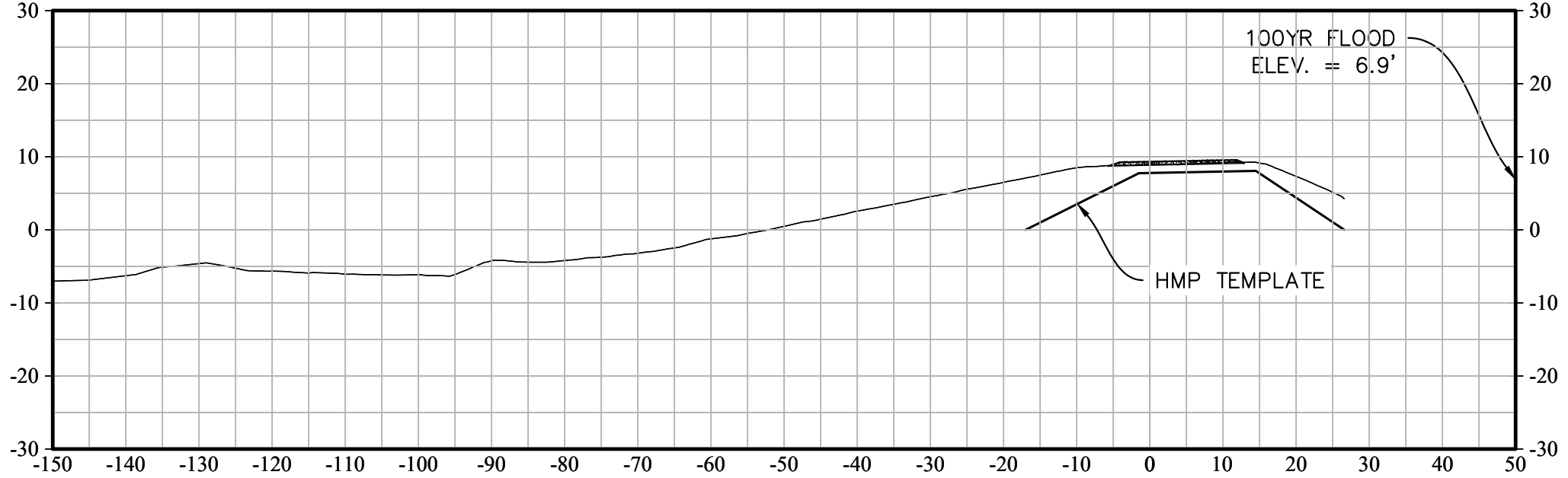
410+00



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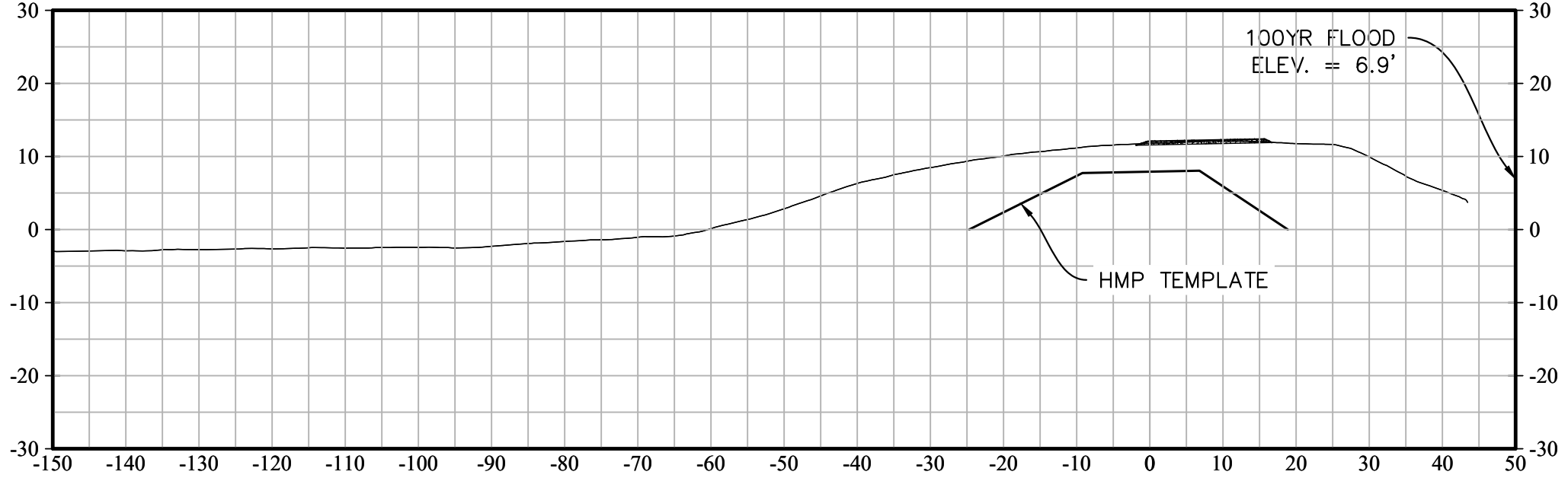

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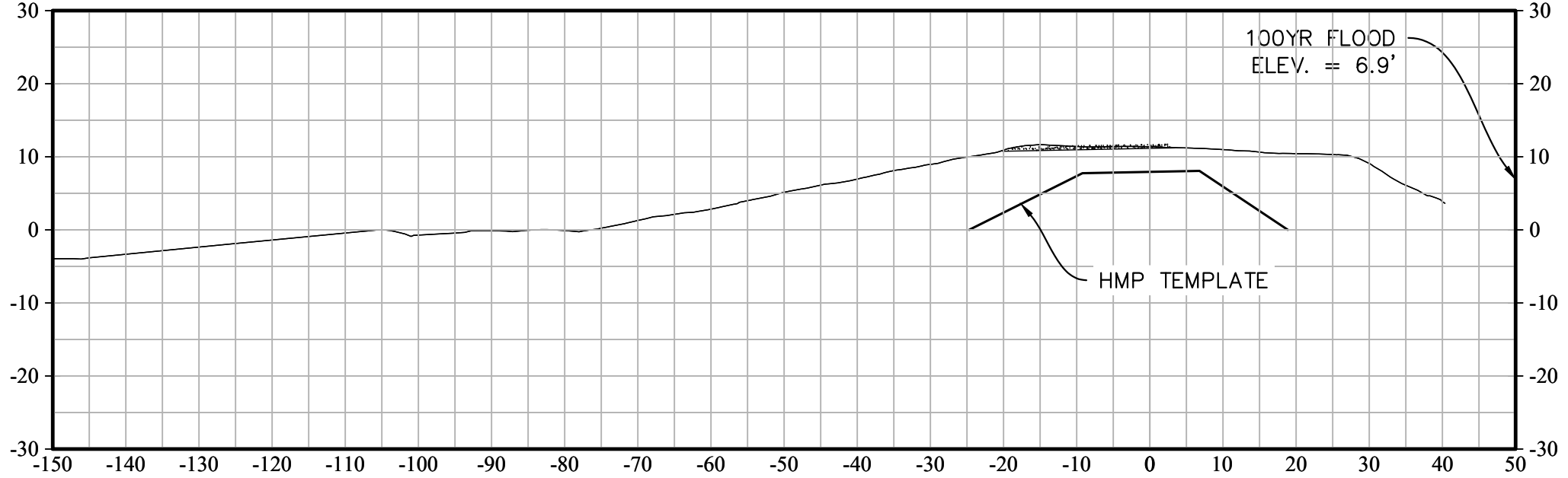
420+00



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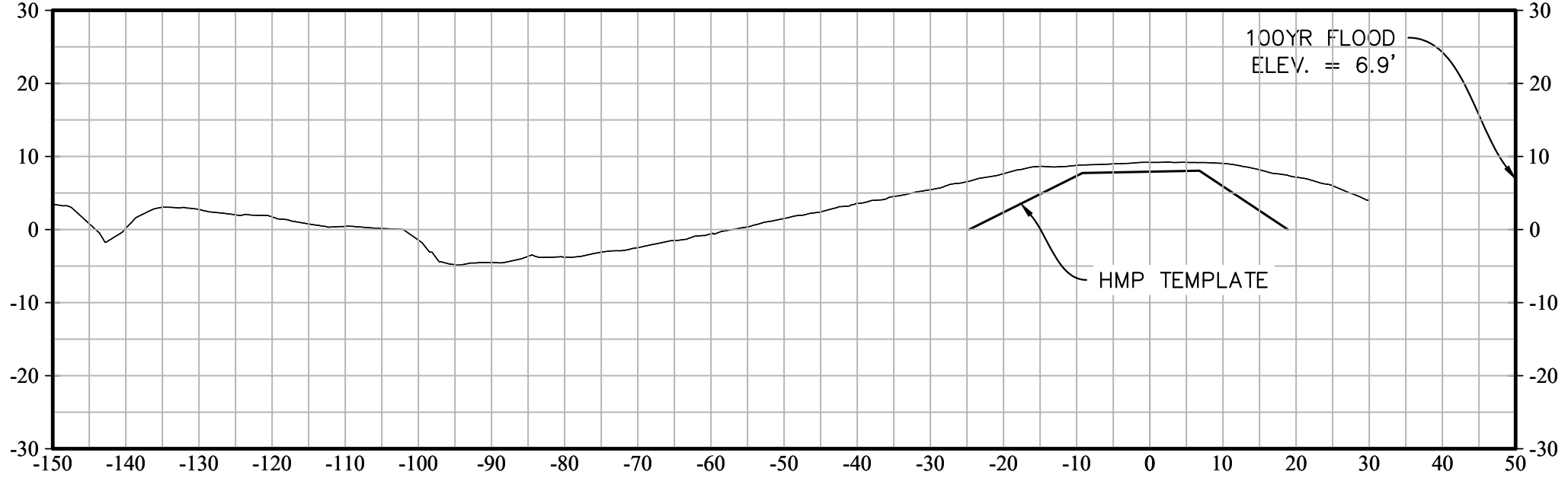

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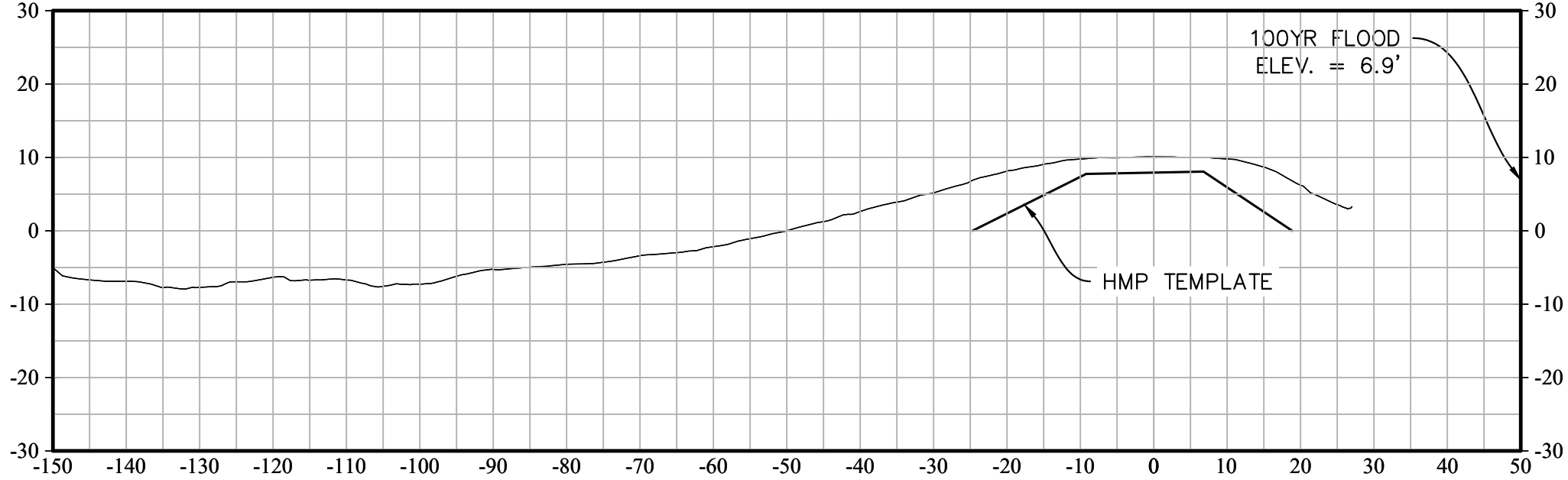
430+00



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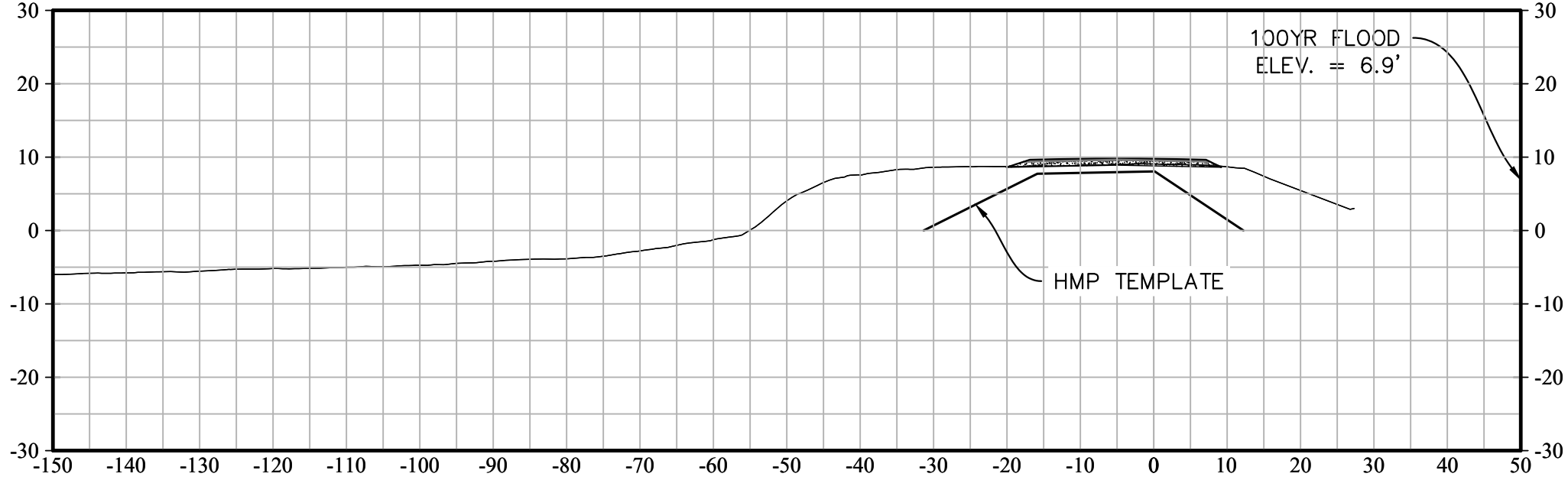

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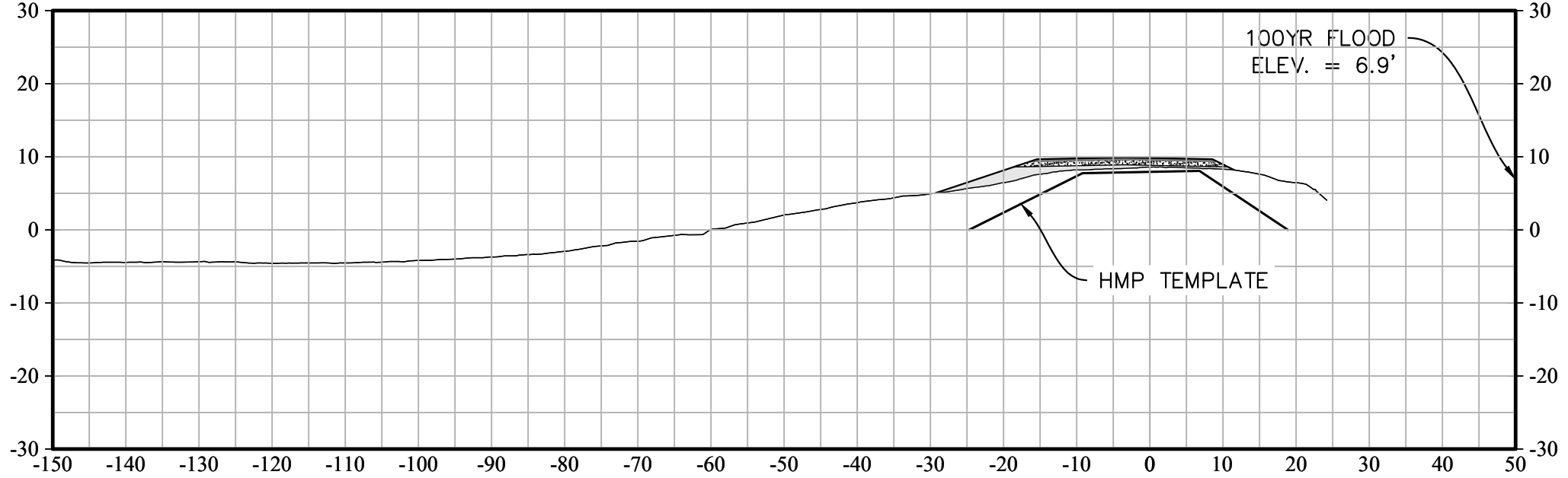
440+00



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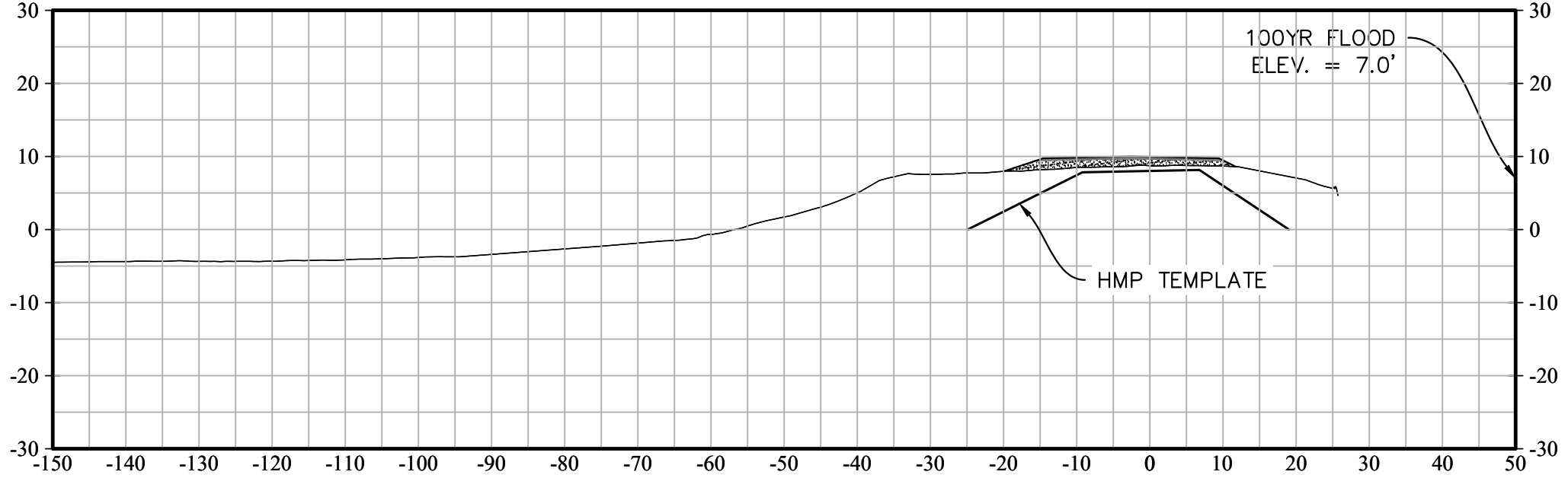

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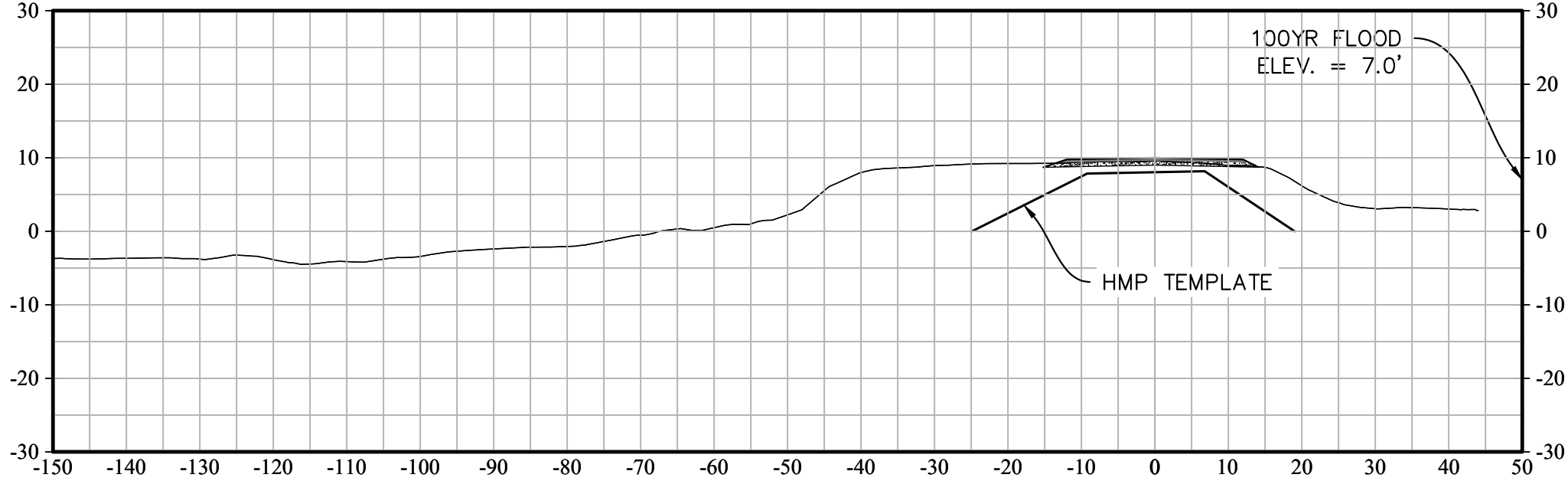
450+00



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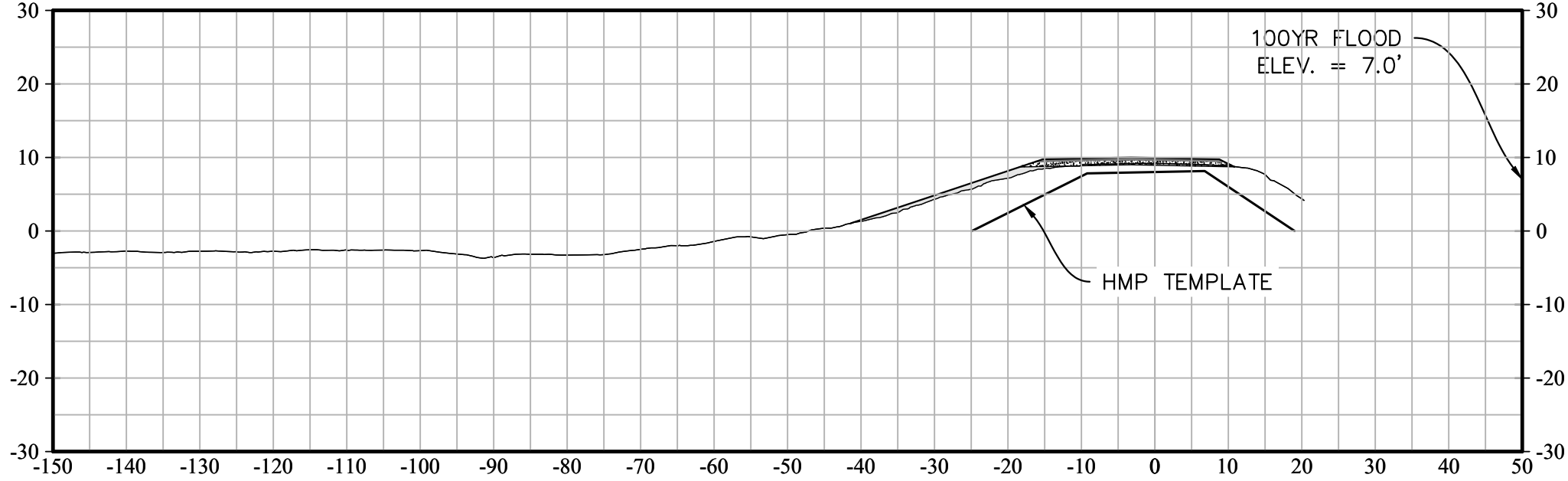

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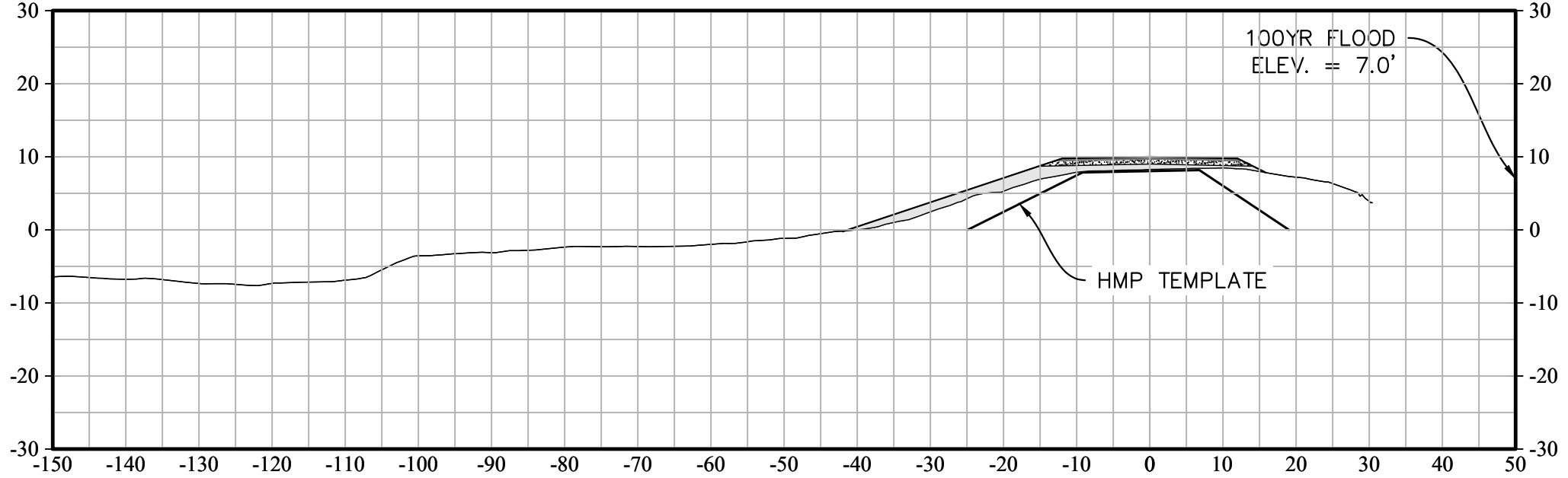
460+00



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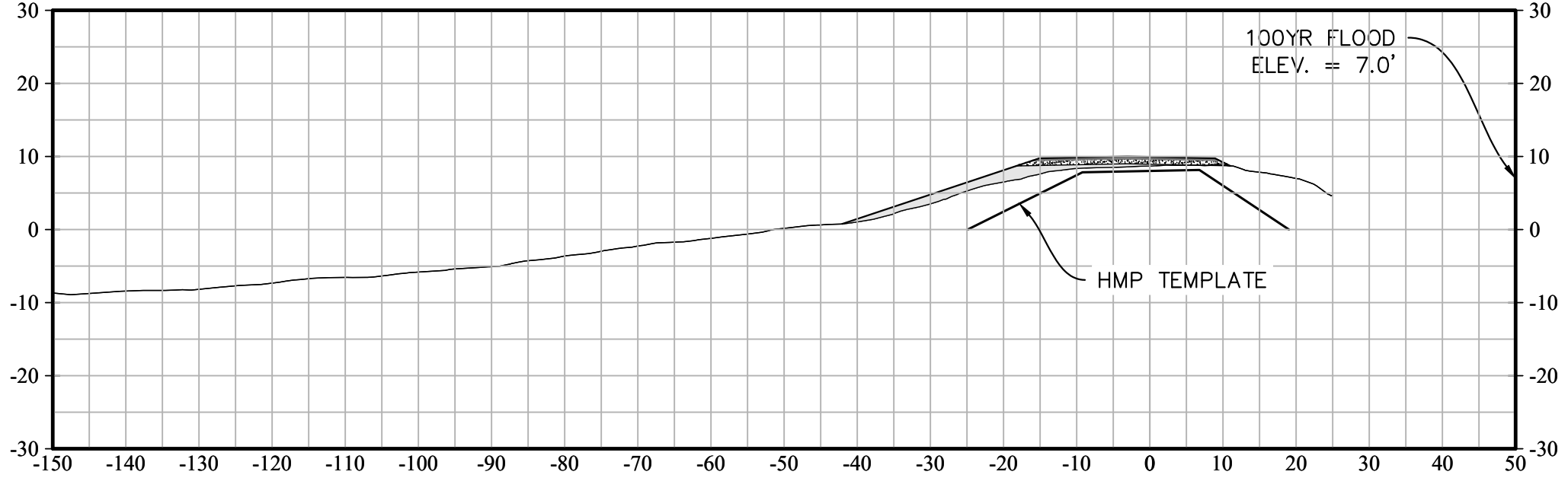

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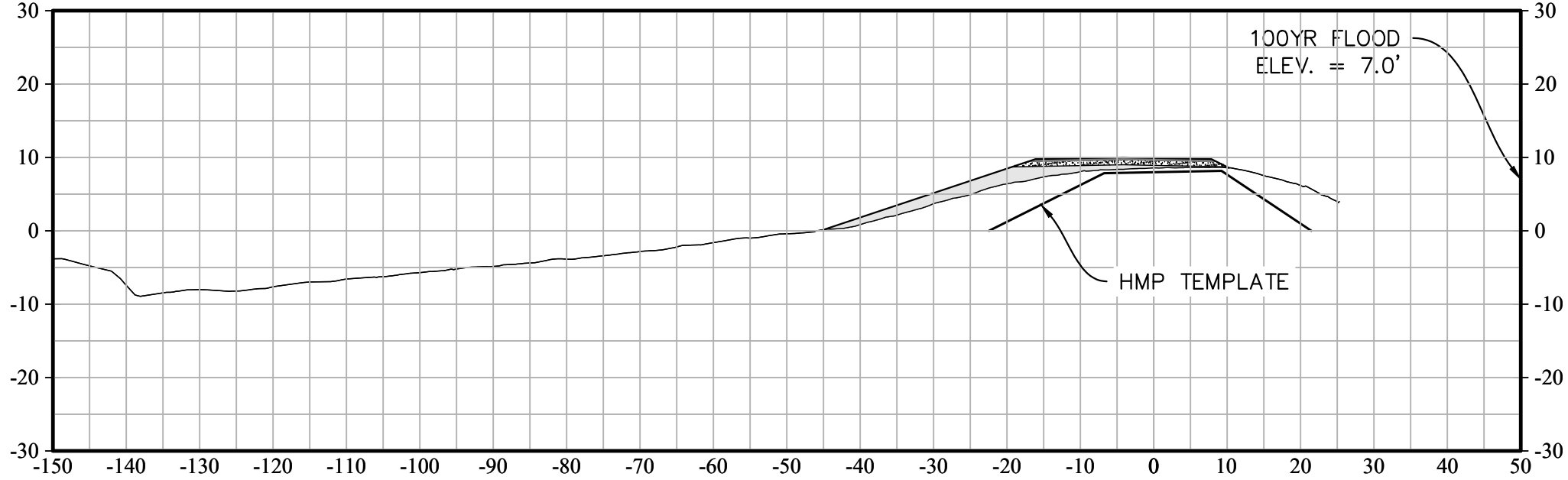
470+00



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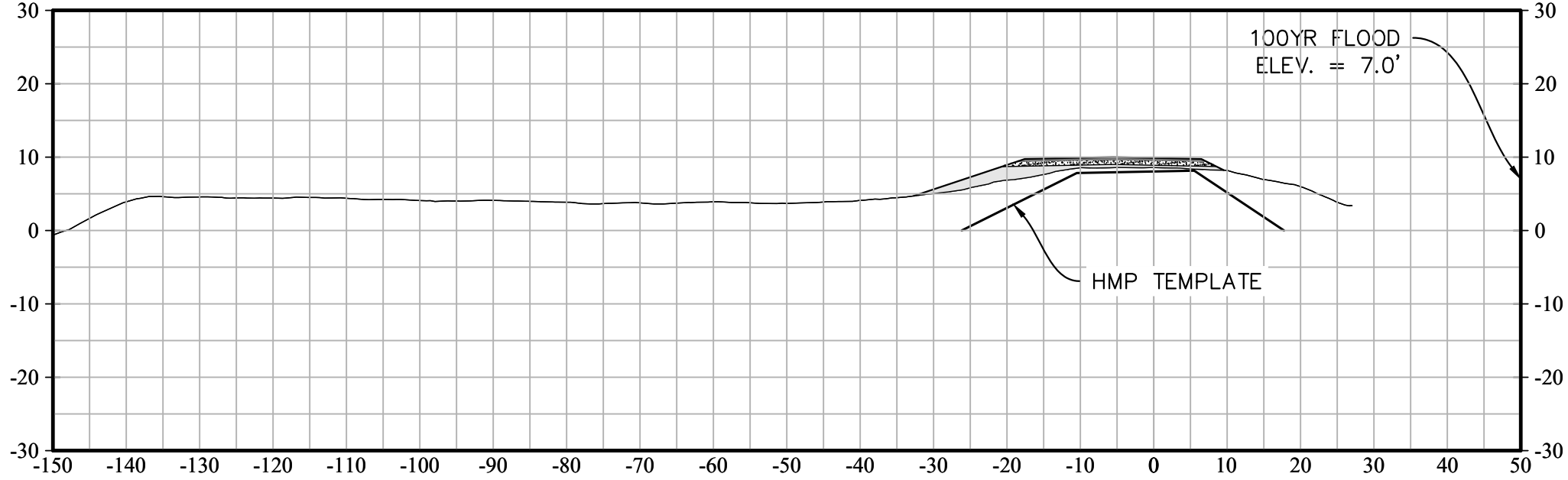

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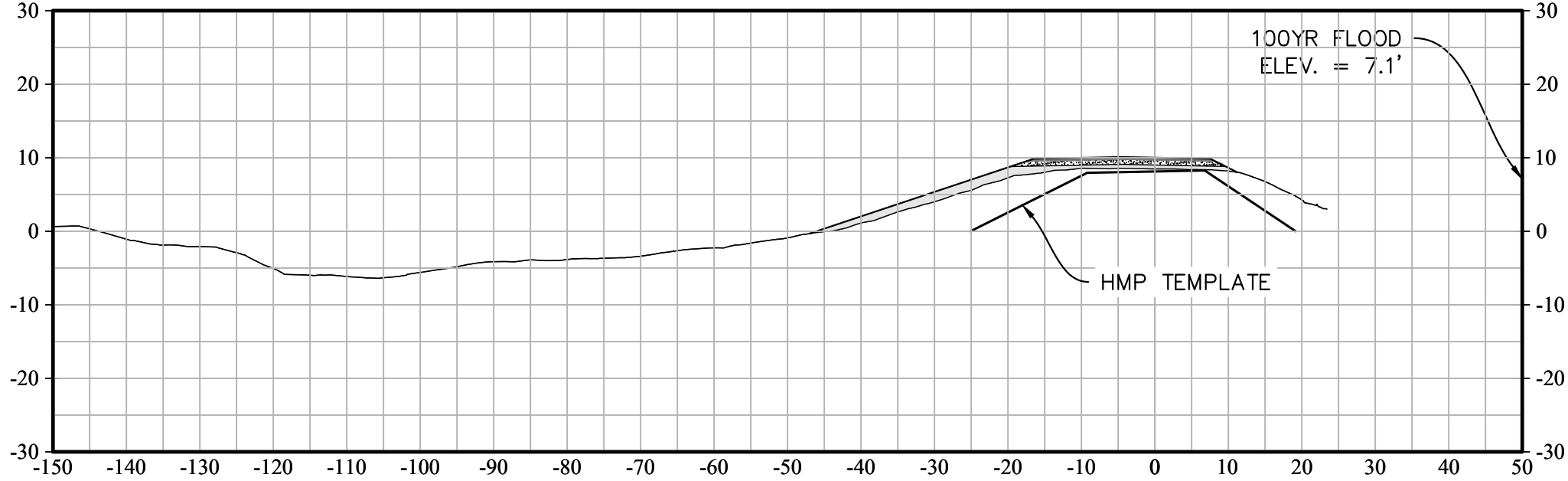
480+00



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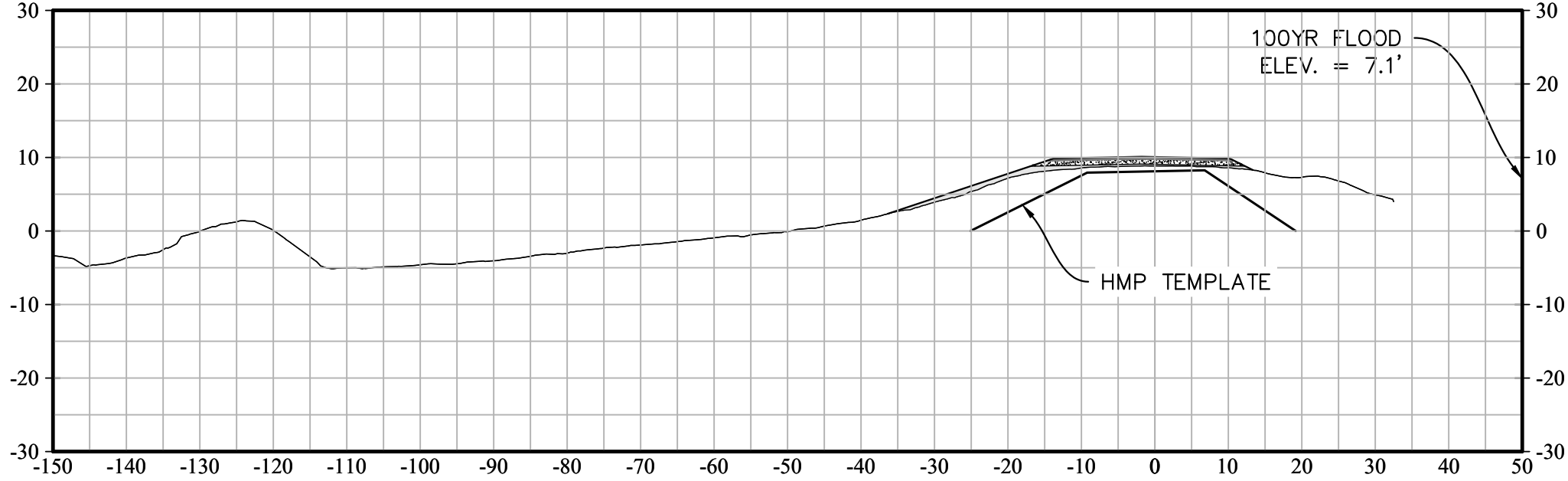

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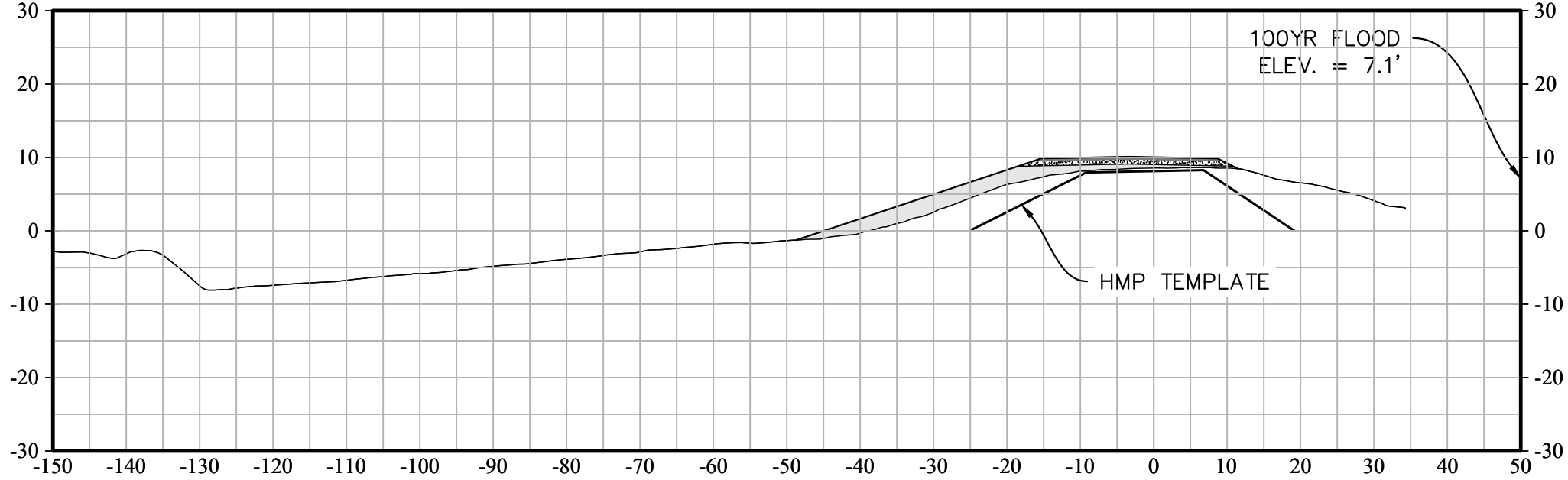
490+00



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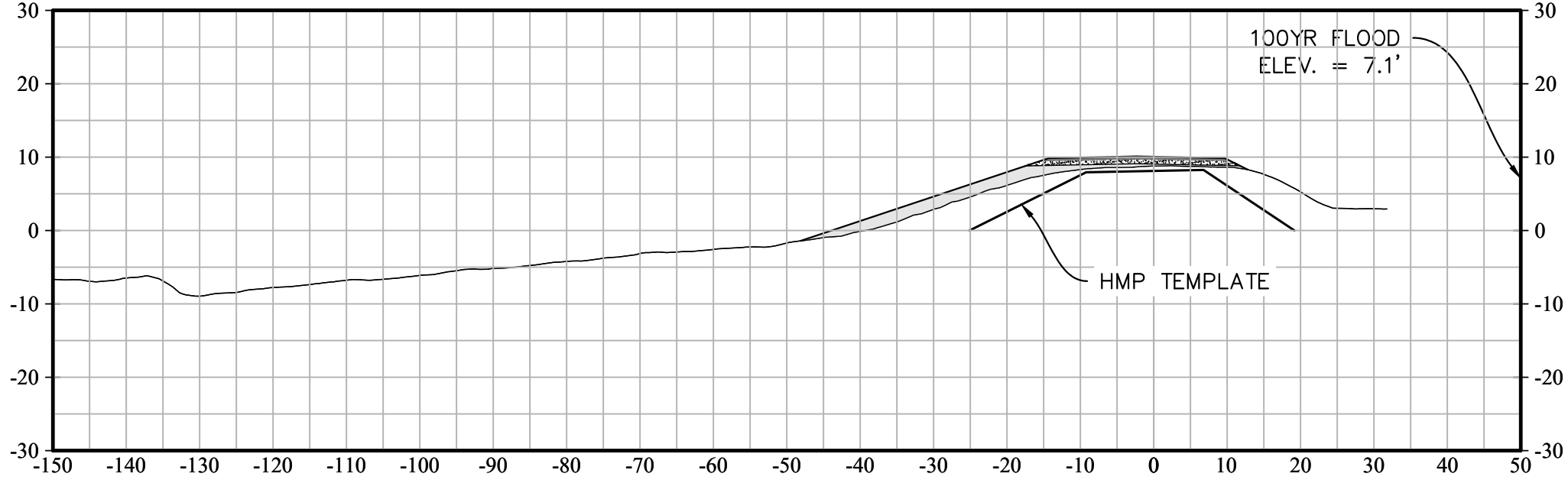

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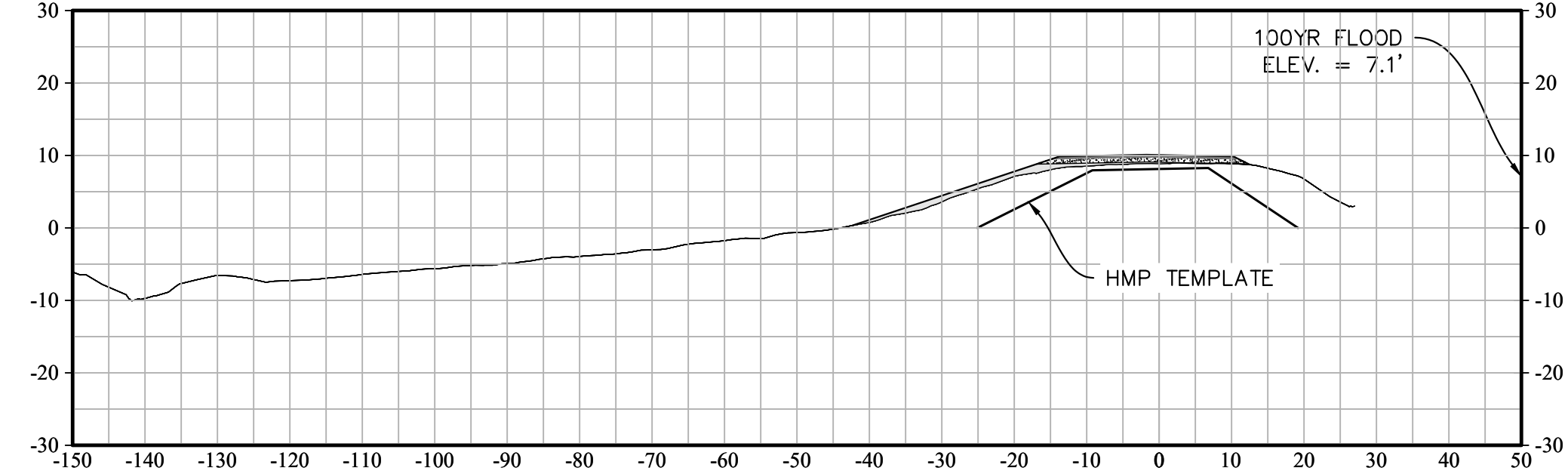
500+00



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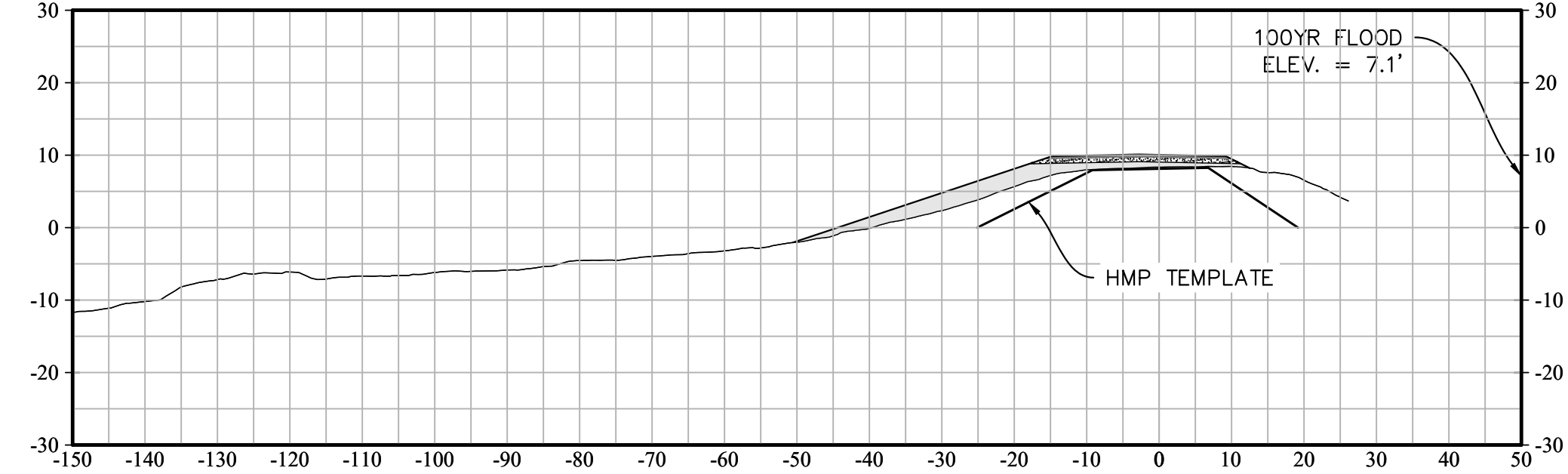

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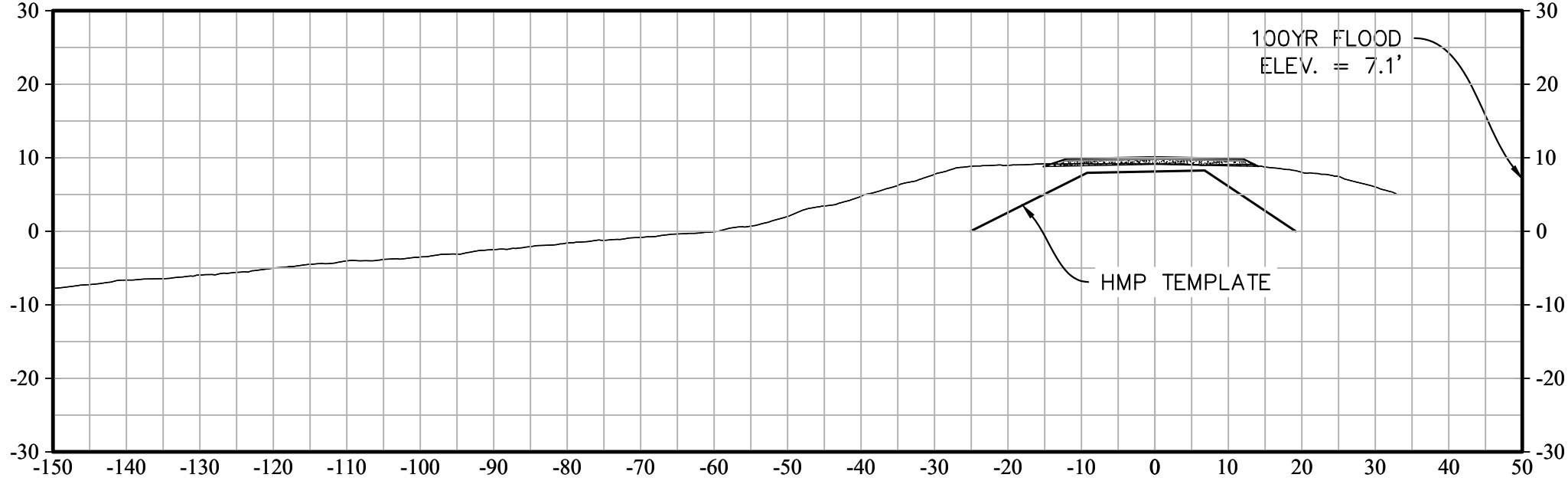
510+00



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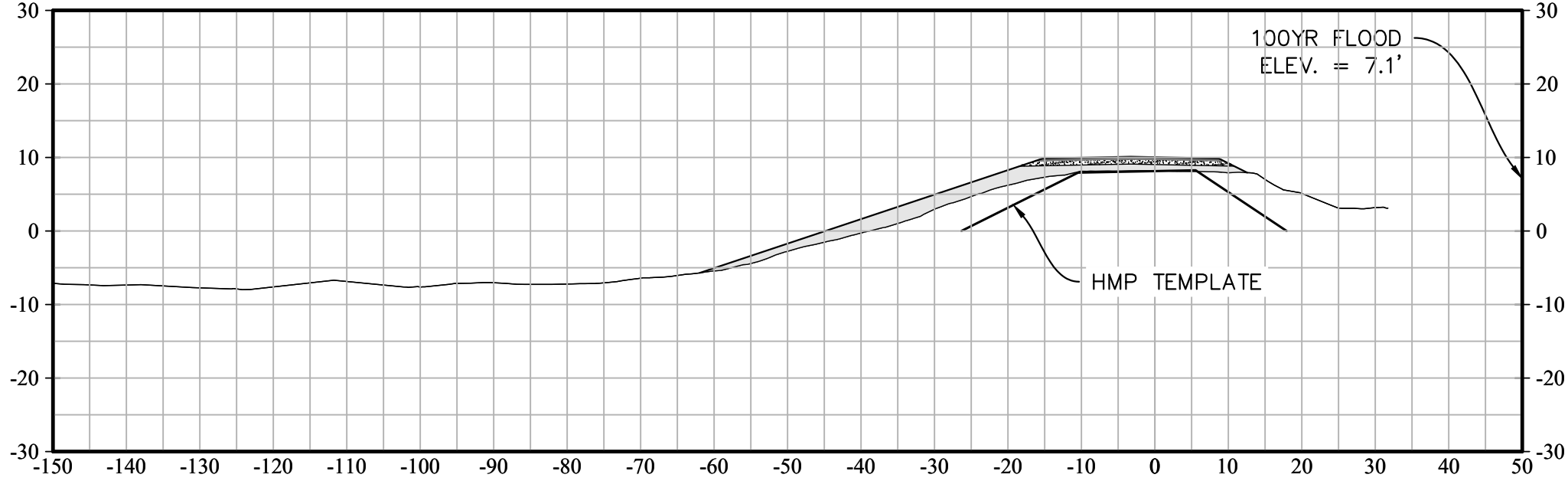

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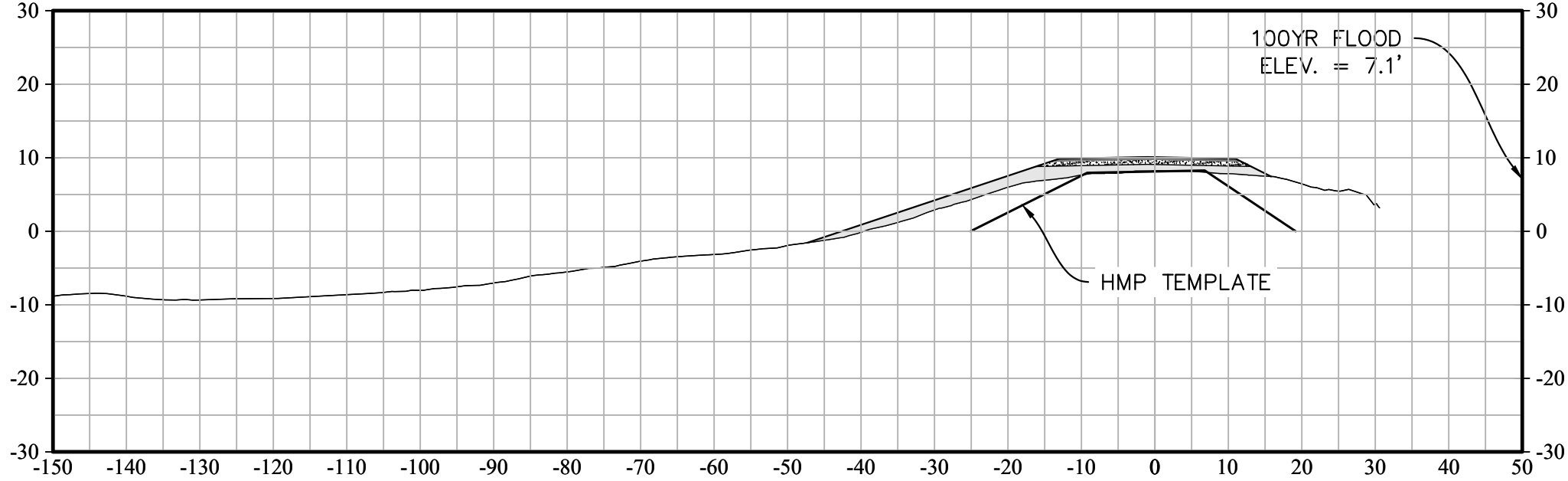
520+00



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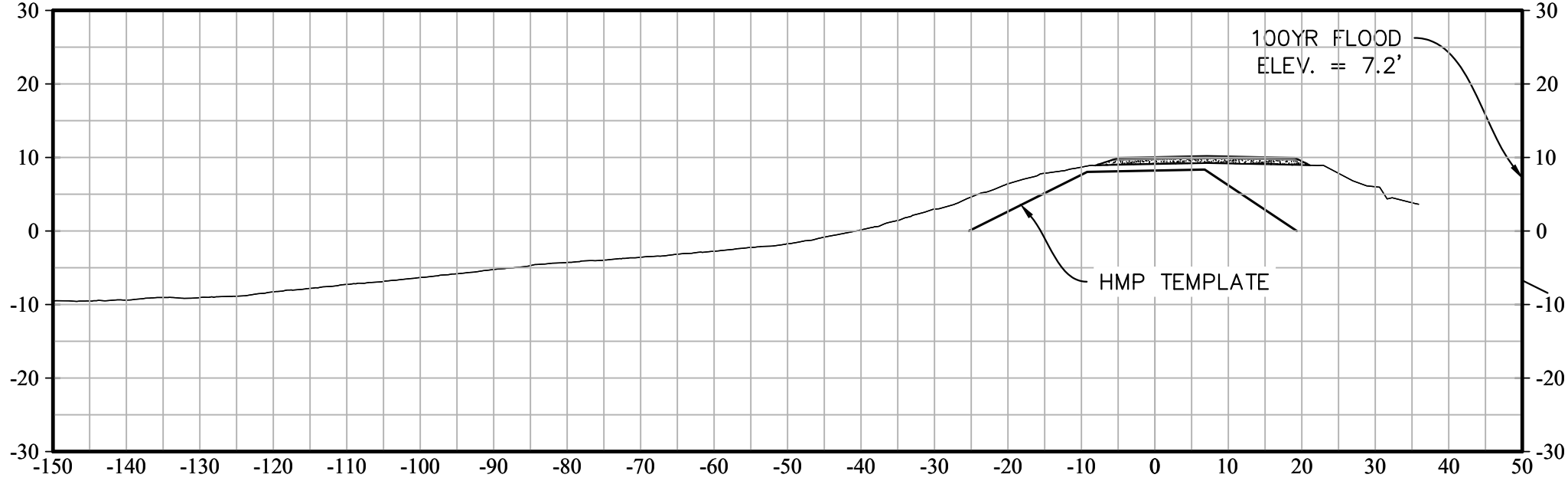

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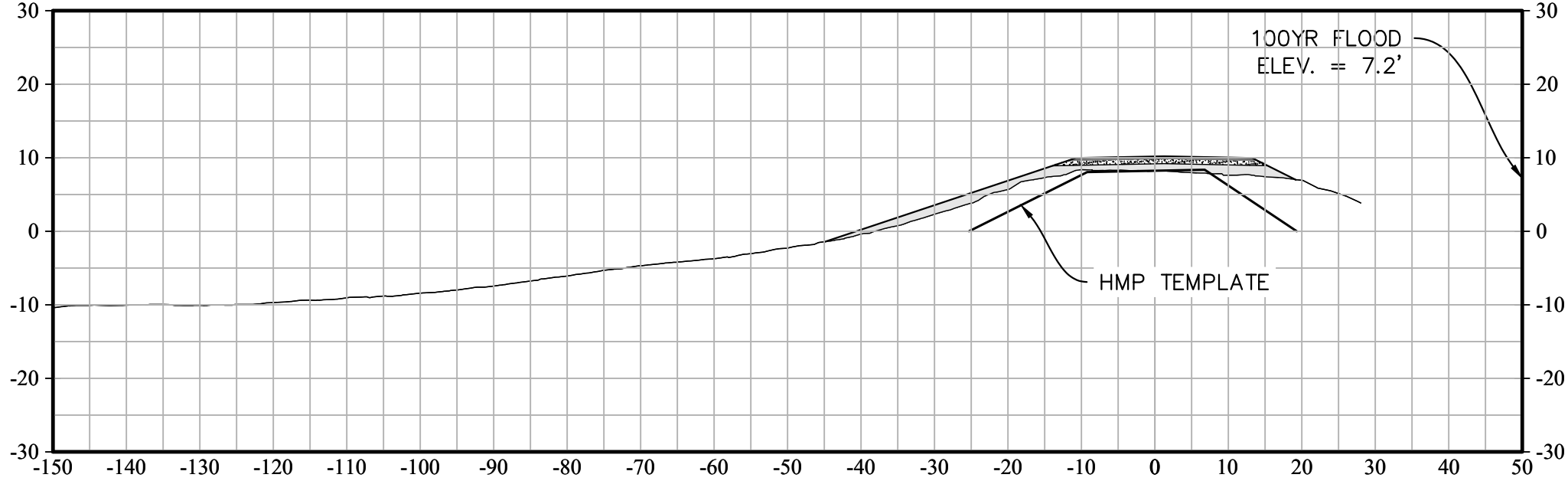
530+00



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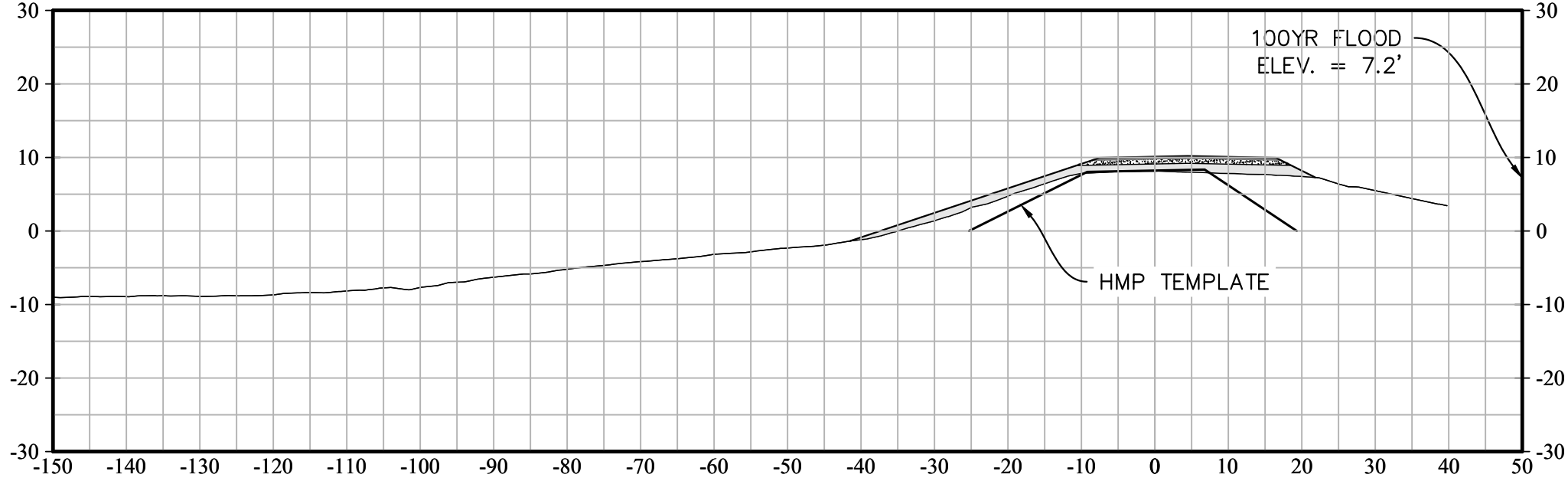

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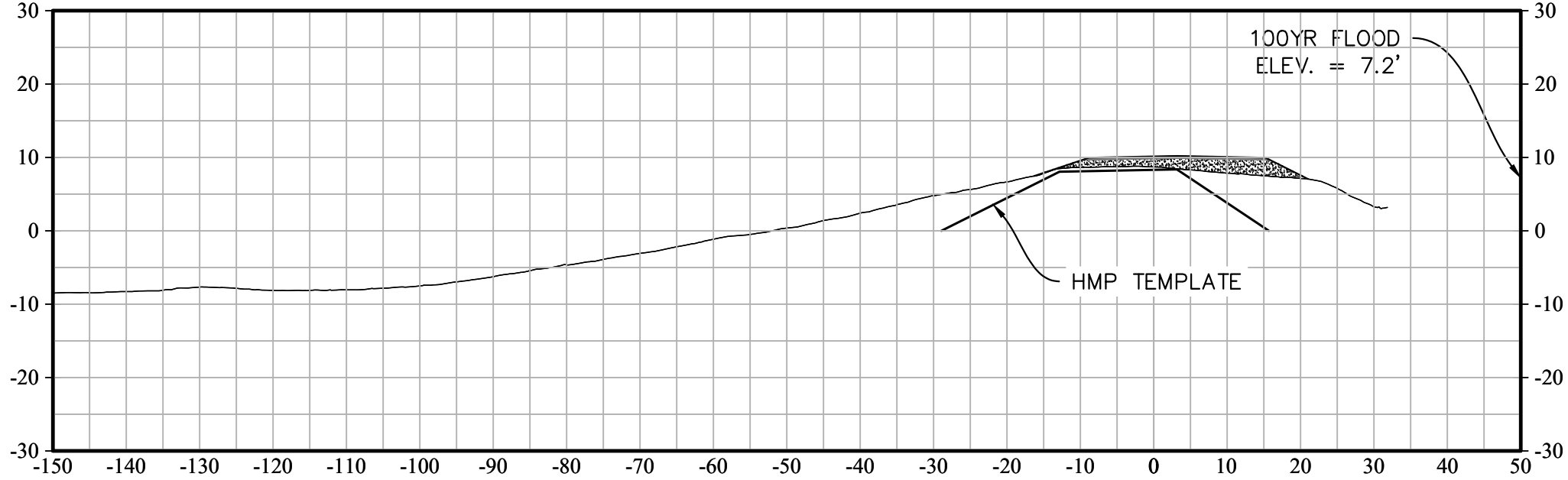
540+00



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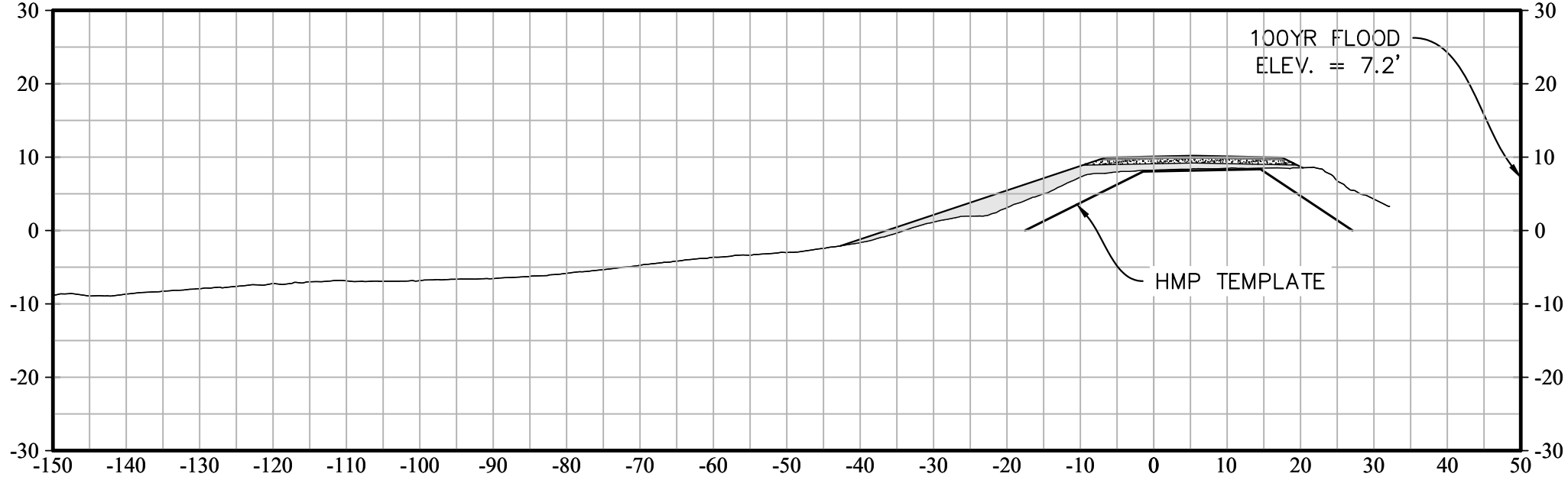

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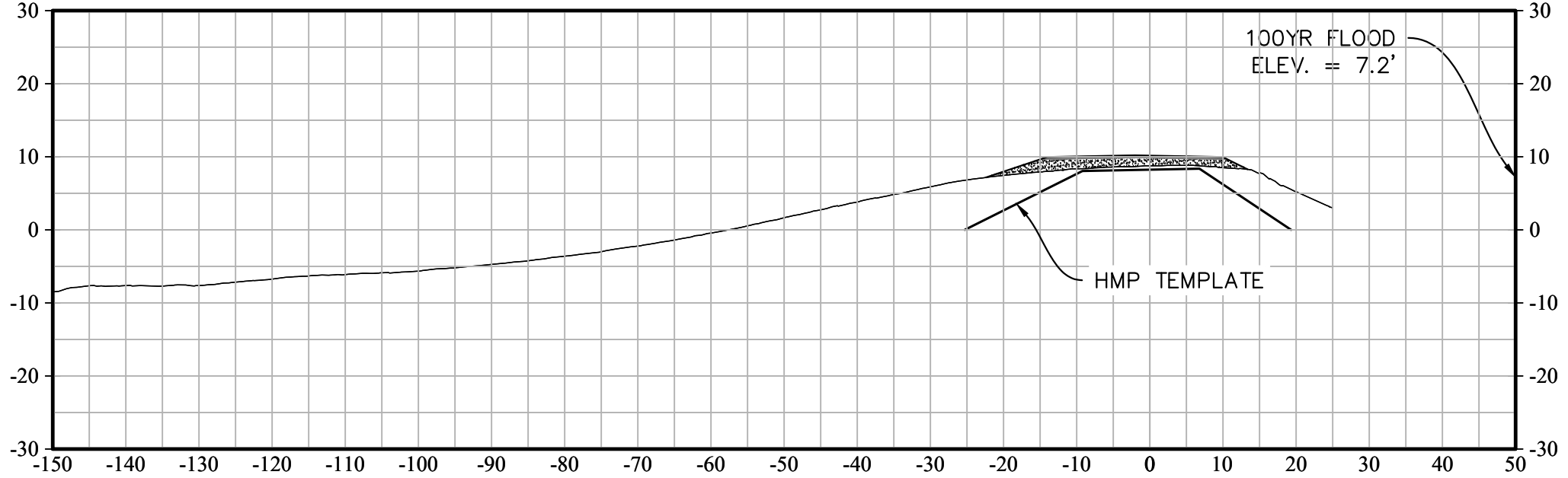

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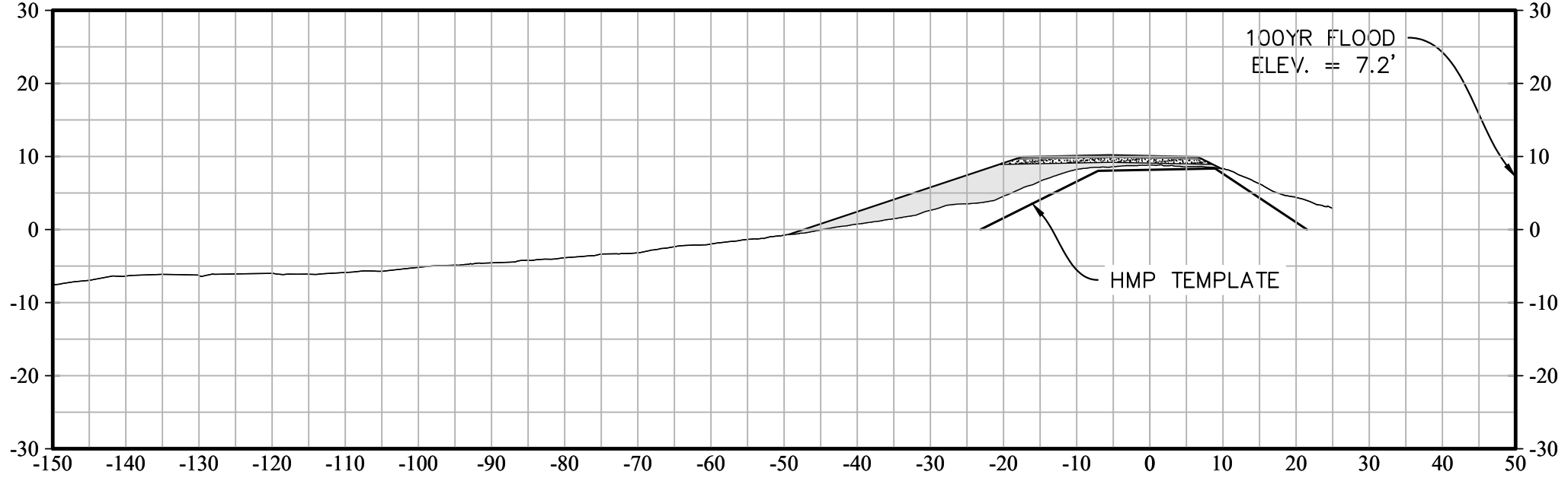

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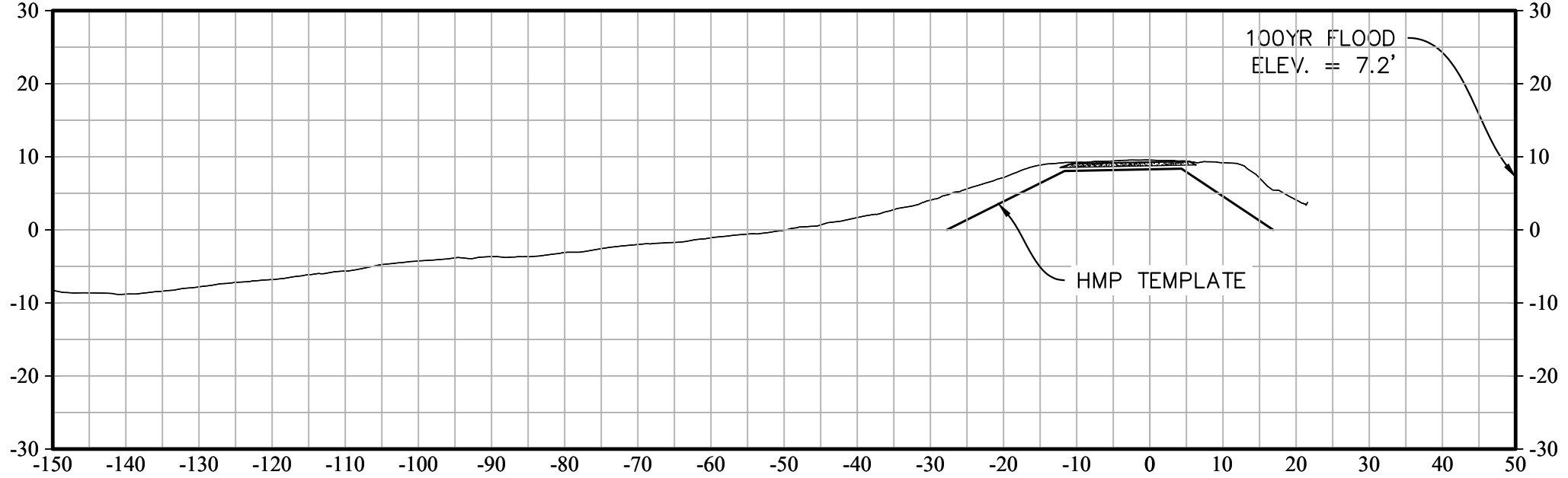
560+00



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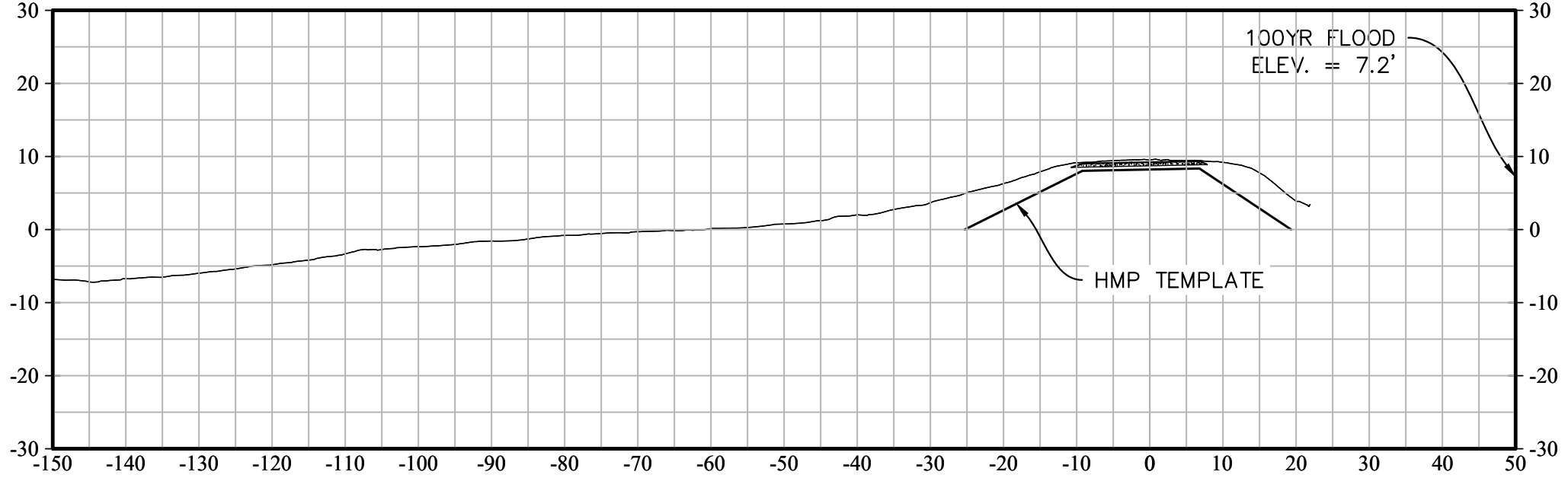

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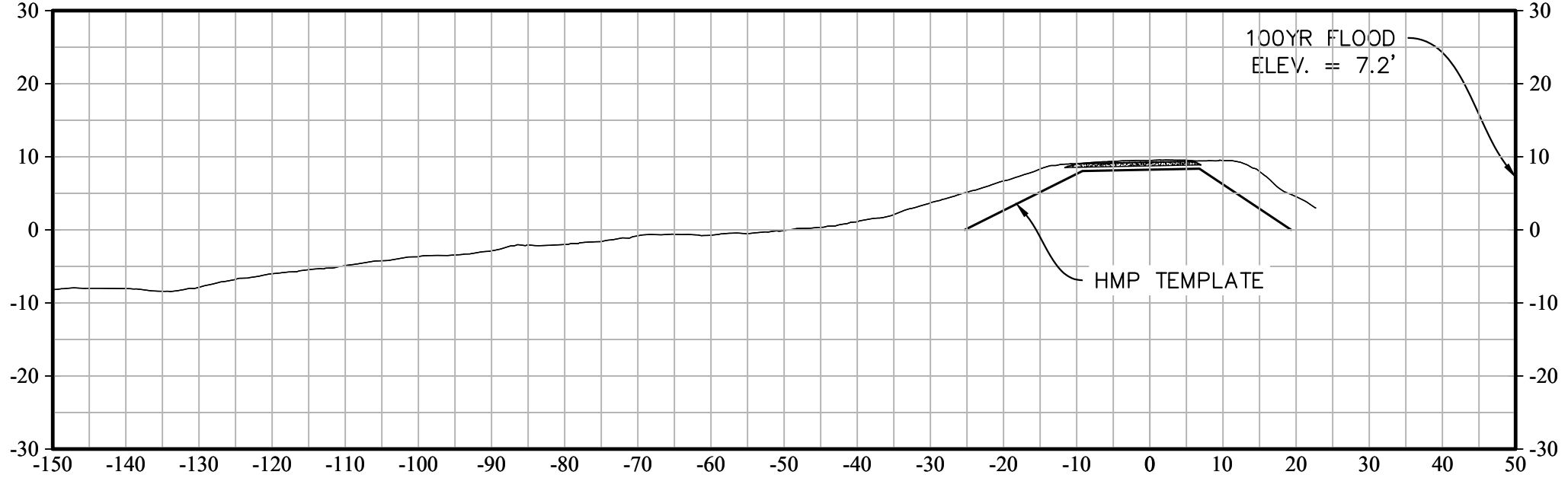

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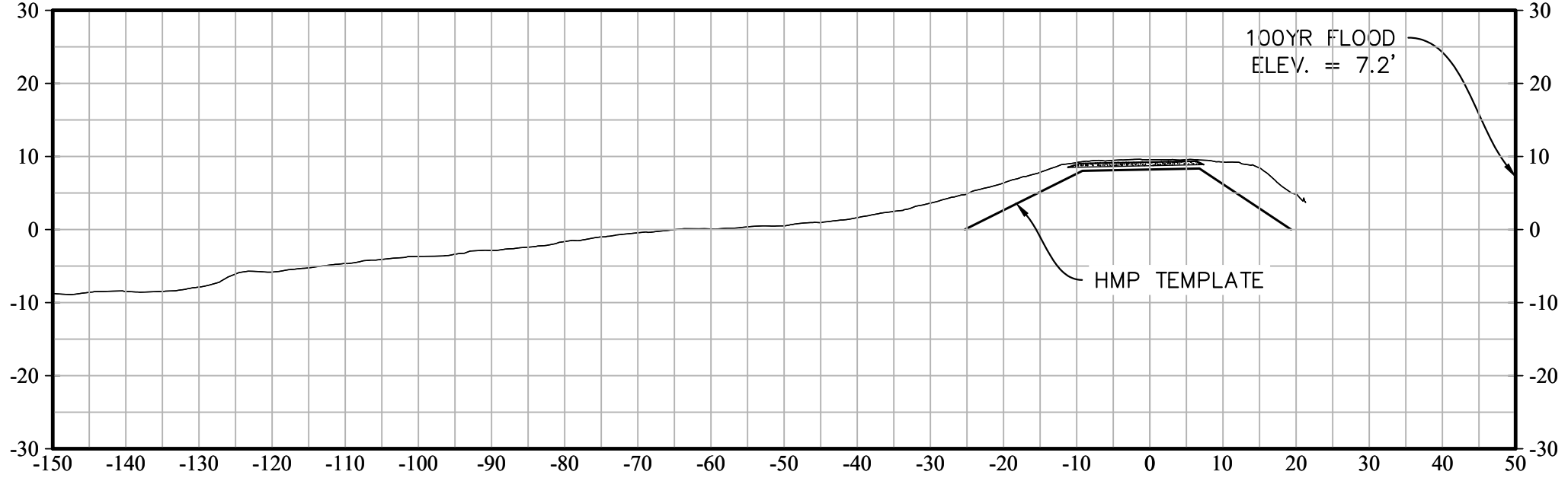

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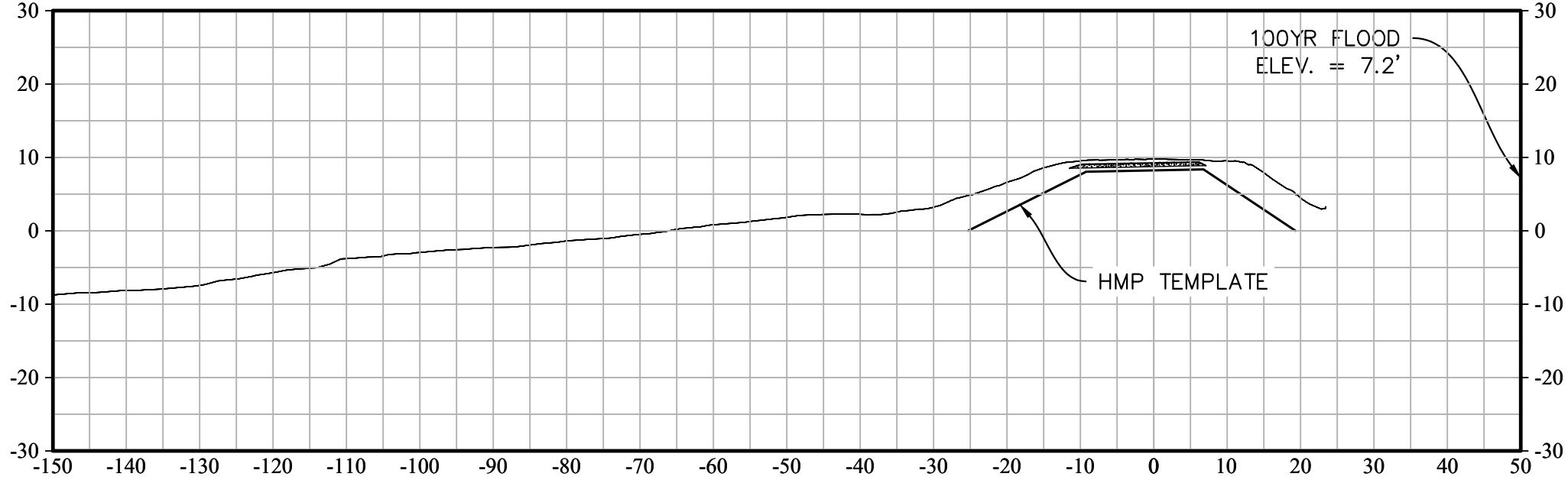
578+56



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Quantity Estimate

Reclamation District No. 2025 - Holland Tract

Stations from 0+00 to End

Five Year Plan Design Cross Sections Quantity Estimate

Station	Length (FT)	Area (FT^2)	Raw Volume (CY)	Onsite Fill Adjusted (CY)	Import Fill Adjusted (TN)
+	250	0.00	0.00	0.00	0.00
5+00	500	0.00	0.00	0.00	0.00
10+00	500	0.00	0.00	0.00	0.00
15+00	500	0.00	0.00	0.00	0.00
20+00	500	0.00	0.00	0.00	0.00
25+00	500	0.00	0.00	0.00	0.00
30+00	500	0.00	0.00	0.00	0.00
35+00	500	0.00	0.00	0.00	0.00
40+00	500	0.00	0.00	0.00	0.00
45+00	500	0.00	0.00	0.00	0.00
50+00	500	0.00	0.00	0.00	0.00
55+00	500	0.00	0.00	0.00	0.00
60+00	500	0.00	0.00	0.00	0.00
65+00	500	0.00	0.00	0.00	0.00
70+00	500	0.00	0.00	0.00	0.00
75+00	500	0.00	0.00	0.00	0.00
80+00	500	0.00	0.00	0.00	0.00
85+00	500	0.00	0.00	0.00	0.00
90+00	500	0.00	0.00	0.00	0.00
95+00	500	0.00	0.00	0.00	0.00
100+00	500	0.00	0.00	0.00	0.00
105+00	500	0.00	0.00	0.00	0.00
110+00	500	0.00	0.00	0.00	0.00
115+00	500	0.00	0.00	0.00	0.00
120+00	500	0.00	0.00	0.00	0.00
125+00	500	0.00	0.00	0.00	0.00
130+00	500	0.00	0.00	0.00	0.00
135+00	500	0.00	0.00	0.00	0.00
140+00	500	0.00	0.00	0.00	0.00
145+00	500	0.00	0.00	0.00	0.00
150+00	500	0.00	0.00	0.00	0.00
155+00	500	0.00	0.00	0.00	0.00
160+00	500	0.00	0.00	0.00	0.00
165+00	500	0.00	0.00	0.00	0.00
170+00	500	0.00	0.00	0.00	0.00
175+00	500	0.00	0.00	0.00	0.00
180+00	500	0.00	0.00	0.00	0.00
185+00	500	0.00	0.00	0.00	0.00
190+00	500	0.00	0.00	0.00	0.00
195+00	500	0.00	0.00	0.00	0.00
200+00	500	0.00	0.00	0.00	0.00
205+00	500	0.00	0.00	0.00	0.00
210+00	500	0.00	0.00	0.00	0.00
215+00	500	0.00	0.00	0.00	0.00
220+00	500	0.00	0.00	0.00	0.00
225+00	500	0.00	0.00	0.00	0.00
230+00	500	0.00	0.00	0.00	0.00
235+00	500	0.00	0.00	0.00	0.00
240+00	500	0.00	0.00	0.00	0.00

Quantity Estimate

Reclamation District No. 2025 - Holland Tract

Stations from 0+00 to End

Five Year Plan Design Cross Sections Quantity Estimate

Station	Length (FT)	Area (FT^2)	Raw Volume (CY)	Onsite Fill Adjusted (CY)	Import Fill Adjusted (TN)
245+00	500	0.00	0.00	0.00	0.00
250+00	500	0.00	0.00	0.00	0.00
255+00	500	0.00	0.00	0.00	0.00
260+00	500	0.00	0.00	0.00	0.00
265+00	500	0.00	0.00	0.00	0.00
270+00	500	0.00	0.00	0.00	0.00
275+00	500	0.00	0.00	0.00	0.00
280+00	500	0.00	0.00	0.00	0.00
285+00	500	0.00	0.00	0.00	0.00
290+00	500	0.00	0.00	0.00	0.00
295+00	500	0.00	0.00	0.00	0.00
300+00	500	0.00	0.00	0.00	0.00
305+00	500	0.00	0.00	0.00	0.00
310+00	500	0.00	0.00	0.00	0.00
315+00	500	0.00	0.00	0.00	0.00
320+00	500	0.00	0.00	0.00	0.00
325+00	500	0.00	0.00	0.00	0.00
330+00	500	0.00	0.00	0.00	0.00
335+00	500	0.00	0.00	0.00	0.00
340+00	500	0.00	0.00	0.00	0.00
345+00	500	0.00	0.00	0.00	0.00
350+00	500	0.00	0.00	0.00	0.00
355+00	500	0.00	0.00	0.00	0.00
360+00	500	0.00	0.00	0.00	0.00
365+00	500	0.00	0.00	0.00	0.00
370+00	500	0.00	0.00	0.00	0.00
375+00	500	0.00	0.00	0.00	0.00
380+00	500	0.00	0.00	0.00	0.00
385+00	500	0.00	0.00	0.00	0.00
390+00	500	0.00	0.00	0.00	0.00
395+00	500	0.00	0.00	0.00	0.00
400+00	500	0.00	0.00	0.00	0.00
405+00	500	0.00	0.00	0.00	0.00
410+00	500	0.00	0.00	0.00	0.00
415+00	500	0.00	0.00	0.00	0.00
420+00	500	0.00	0.00	0.00	0.00
425+00	500	0.00	0.00	0.00	0.00
430+00	500	0.00	0.00	0.00	0.00
435+00	500	0.00	0.00	0.00	0.00
440+00	500	27.58	510.81	740.68	1115.61
445+00	500	0.00	0.00	0.00	0.00
450+00	500	0.00	0.00	0.00	0.00
455+00	500	16.16	299.31	434.00	653.70
460+00	500	55.16	1021.50	1481.18	2230.96
465+00	500	39.01	722.43	1047.52	1577.78
470+00	500	56.55	1047.26	1518.53	2287.21
475+00	500	33.45	619.50	898.28	1352.99
480+00	500	48.37	895.76	1298.85	1956.34
485+00	500	21.33	395.06	572.83	862.81

Quantity Estimate

Reclamation District No. 2025 - Holland Tract

Stations from 0+00 to End

Five Year Plan Design Cross Sections Quantity Estimate

Station	Length (FT)	Area (FT^2)	Raw Volume (CY)	Onsite Fill Adjusted (CY)	Import Fill Adjusted (TN)
490+00	500	79.61	1474.21	2137.60	3219.66
495+00	500	60.96	1128.91	1636.92	2465.53
500+00	500	25.25	467.64	678.08	1021.33
505+00	500	85.46	1582.59	2294.75	3456.37
510+00	500	0.00	0.00	0.00	0.00
515+00	500	99.78	1847.84	2679.36	4035.68
520+00	500	73.17	1354.96	1964.69	2959.23
525+00	500	0.00	0.00	0.00	0.00
530+00	500	64.62	1196.59	1735.05	2613.34
535+00	500	64.41	1192.72	1729.44	2604.89
540+00	500	0.00	0.00	0.00	0.00
545+00	500	70.39	1303.44	1889.98	2846.70
550+00	500	0.00	0.00	0.00	0.00
555+00	500	106.20	1966.62	2851.60	4295.10
560+00	500	0.00	0.00	0.00	0.00
565+00	500	0.00	0.00	0.00	0.00
570+00	500	0.00	0.00	0.00	0.00
575+00	428	0.00	0.00	0.00	0.00
578+56	178	0.00	0.00	0.00	0.00
TOTALS	**57,856**	**1,027**	**19,027**	**27,589**	**41,555**

Note: Onsite Fill Adjusted does not include haul road allocation

Centerline Profile Site Data

Reclamation District No. 2025 - Holland Tract
Sites Meeting HMP (NGVD 29)

Site No.	Beginning Station	End Station	Length (Ft)
1	0+00	368+76	36,876
2	368+99	531+51	16,252
3	531+95	534+09	214
4	535+43	542+90	747
5	543+08	578+56	3,548
		TOTAL LENGTH:	**57,637**

Cross Section Site Data

Reclamation District No. 2025 - Holland Tract
Sites Meeting HMP (NGVD 29)

Site No.	Beginning Station	End Station	Length (Ft)
1	0+00	512+50	51,250
2	522+50	527+50	500
3	537+50	578+56	4,106
		TOTAL LENGTH:	**55,856**

HMP Site Data

Reclamation District No. 2025 - Holland Tract
Sites Meeting HMP (NGVD 29)

Site No.	Beginning Station	End Station	Length (Ft)
1	0+00	368+76	36,876
2	368+99	512+50	14,351
3	522+50	527+50	500
4	537+50	542+90	540
5	543+08	578+56	3,548
		TOTAL LENGTH:	**55,815**

Centerline Profile Site Data

Reclamation District No. 2025 - Holland Tract
Sites Meeting PL 84-99 (NGVD 29)

Site No.	Beginning Station	End Station	Length (Ft)
1	0+00	368+43	36,843
2	369+37	440+22	7,085
3	443+53	458+40	1,487
4	460+29	470+07	978
5	475+57	476+42	85
6	478+98	479+51	53
7	483+26	489+95	669
8	491+34	492+92	158
9	493+24	501+48	824
10	506+03	508+08	205
11	509+31	511+04	173
12	520+68	521+08	40
13	522+58	528+93	635
14	549+83	578+56	2,873
		TOTAL LENGTH:	**52,108**

Cross Section Site Data

Reclamation District No. 2025 - Holland Tract
Sites Meeting PL 84-99 (NGVD 29)

Site No.	Beginning Station	End Station	Length (Ft)
1	0+00	437+50	43,750
2	442+50	457+50	1,500
3	462+50	467+50	500
4	482+50	487+50	500
5	497+50	502+50	500
6	507+50	512+50	500
7	522+50	527+50	500
8	557+50	578+56	2,106
		TOTAL LENGTH:	**49,856**

PL 84-99 Site Data

Reclamation District No. 2025 - Holland Tract
Sites Meeting PL 84-99 (NGVD 29)

Site No.	Beginning Station	End Station	Length (Ft)
1	0+00	368+43	36,843
2	369+37	437+50	6,813

3	443+53	457+50	1,397
4	462+50	467+50	500
5	483+26	487+50	424
6	497+50	501+48	398
7	507+50	508+08	58
8	509+31	511+04	173
9	522+58	527+50	492
10	557+50	578+56	2,106
		TOTAL LENGTH:	**49,204**

Centerline Profile Site Data

Reclamation District No. 2025 - Holland Tract
Sites Meeting Bulletin 192-82 (NGVD 29)

Site No.	Beginning Station	End Station	Length (Ft)
1	0+00	74+32	7,432
2	76+09	160+25	8,416
3	169+41	169+76	35
4	170+04	307+18	13,714
5	308+73	327+62	1,889
6	328+17	336+33	816
7	337+90	356+02	1,812
8	356+11	363+01	690
9	363+28	364+07	79
10	364+95	365+16	21
11	366+90	367+97	107
12	369+60	371+02	142
13	371+33	373+23	190
14	373+65	374+46	81
15	378+89	385+03	614
16	396+88	406+06	918
17	413+05	437+93	2,488
18	445+47	456+54	1,107
19	461+35	463+18	183
20	509+82	510+11	29
21	525+64	526+12	48
22	555+94	556+27	33
23	557+15	578+56	2,141
		TOTAL LENGTH:	**42,985**

Cross Section Site Data

Reclamation District No. 2025 - Holland Tract
Sites Meeting Bulletin 192-82 (NGVD 29)

Site No.	Beginning Station	End Station	Length (Ft)
1	0+00	67+50	6,750
2	77+50	147+50	7,000
3	172+50	317+50	14,500
4	322+50	362+50	4,000
5	367+50	372+50	500
6	377+50	387+50	1,000
7	392+50	402+50	1,000
8	407+50	437+50	3,000
9	447+50	452+50	500
10	557+50	578+56	2,106

	TOTAL LENGTH:	**40,356**

192-82 Site Data

Reclamation District No. 2025 - Holland Tract

Sites Meeting Bulletin 192-82 (NGVD 29)

Site No.	Beginning Station	End Station	Length (Ft)
1	0+00	67+50	6,750
2	77+50	147+50	7,000
3	172+50	307+18	13,468
4	308+73	317+50	877
5	322+50	327+62	512
6	328+17	336+33	816
7	337+90	356+02	1,812
8	356+11	362+50	639
9	367+50	367+97	47
10	369+60	371+02	142
11	371+33	372+50	117
12	378+89	385+03	614
13	396+88	402+50	562
14	413+05	437+50	2,445
15	447+50	452+50	500
16	557+50	578+56	2,106
		TOTAL LENGTH:	**38,407**

Appendix C – Cost Estimates

Preliminary Probable Project Construction Cost Model Holland Tract - Reclamation District No. 2025 - Sta 555 to 578+56 and 0 to 171					
Line Item	Description	Estimated Quantity	Unit of Measure	Price	
				Unit	Total
1	**Levee Rehabilitation**				
1.01	Mobilization/Demobilization	1	LS	$50,000	$50,000
1.02	Clearing/Grubbing/Site Prep	1	LS	$75,000	$75,000
1.03	Quarry Stone Protection	19,500	TN	$50	$975,000
				SUBTOTAL:	**$1,100,000**
2	**Contingency**				
2.01	20% of Construction Cost				**$220,000**
				TOTAL ESTIMATED COST (ROUNDED)	**$1,320,000**

Notes:

1.)
2.)
3.)
4.)
5.)
6.)

Preliminary Probable Project Construction Cost Model Holland Tract - Reclamation District No. 2025 - Sta 430 to 555+00					
Line Item	Description	Estimated Quantity	Unit of Measure	Price	
				Unit	Total
1	**Levee Rehabilitation**				
1.01	Mobilization/Demobilization	1	LS	$150,000	$150,000
1.02	Clearing/Grubbing/Site Prep	1	LS	$150,000	$150,000
1.03	Embankment Fill	32,600	CY	$12.00	$391,200
1.04	Replace Existing Siphons/Pipes	5	EA	$25,000	$125,000
1.05	Encroachment Relocation	1	LS	$500,000	$500,000
1.06	Exploratory Trench	87,500	SF	$1.00	$87,500
1.07	Hydroseed	437,500	SF	$0.30	$131,250
1.08	Import Class 2 AB	17,900	TN	$35.00	$626,500
1.09	Asphalt Concrete	7,700	TN	$130.00	$1,001,000
1.10	Quarry Stone	12,500	TN	$50.00	$625,000
1.11	Traffic Control	1	LS	$250,000.00	$250,000
				SUBTOTAL:	**$4,037,450**
2	**Contingency**				
2.01	20% of Construction Cost				**$807,490**
				TOTAL ESTIMATED COST (ROUNDED)	**$4,845,000**

Notes:

1.) Encroachment relocation is a lump sum allocation for relocation of buried utilities and other encroachments.
2.) Aggregate base is an 8" layer, 24' wide along the county road.
3.) Asphalt concrete includes 4" overlay along 24' wide county road.
4.)
5.)
6.)

Preliminary Probable Project Construction Cost Model Holland Tract - Reclamation District No. 2025 - Sta 555 to 578+56 and 0 to 420					
Line Item	Description	Estimated Quantity	Unit of Measure	Price	
				Unit	Total
1	**Levee Rehabilitation**				
1.01	Mobilization/Demobilization	1	LS	$50,000	$50,000
1.02	Clearing/Grubbing/Site Prep	1	LS	$75,000	$75,000
1.03	Import Class 2 AB	29,900	TN	$35	$1,046,500
				SUBTOTAL:	**$1,171,500**
2	**Contingency**				
2.01	20% of Construction Cost				**$234,300**
				TOTAL ESTIMATED COST (ROUNDED)	**$1,406,000**

Notes:

1.)
2.)
3.)
4.)
5.)
6.)

Reclamation District No. 2025 - Holland Tract

Five Year Plan Cost Estimate Summary

Phase	Standard	Stationing (*feet*)	Project Length (*feet*)	Estimate[1] *Onsite Fill (cy)*	Estimate[1] *AB (tons)*	Construction Cost Estimate[2] *($)*	Engineering & Environmental[3] *($)*	Total *($)*
1	Bulletin 192-82	555+00 - 578+56 0+00 - 171+00	19,456	0	0	$1,320,000	$264,000	$1,584,000
2	Bulletin 192-82	430+00 - 555+00	12,500	32,600	17,900	$5,087,250	$1,017,450	$6,104,700
3	Bulletin 192-82	555+00 - 578+56 0+00 - 420+00	44,356	0	29,900	$1,550,115	$310,023	$1,860,138
						Grand Total (rounded):		**$9,548,800**

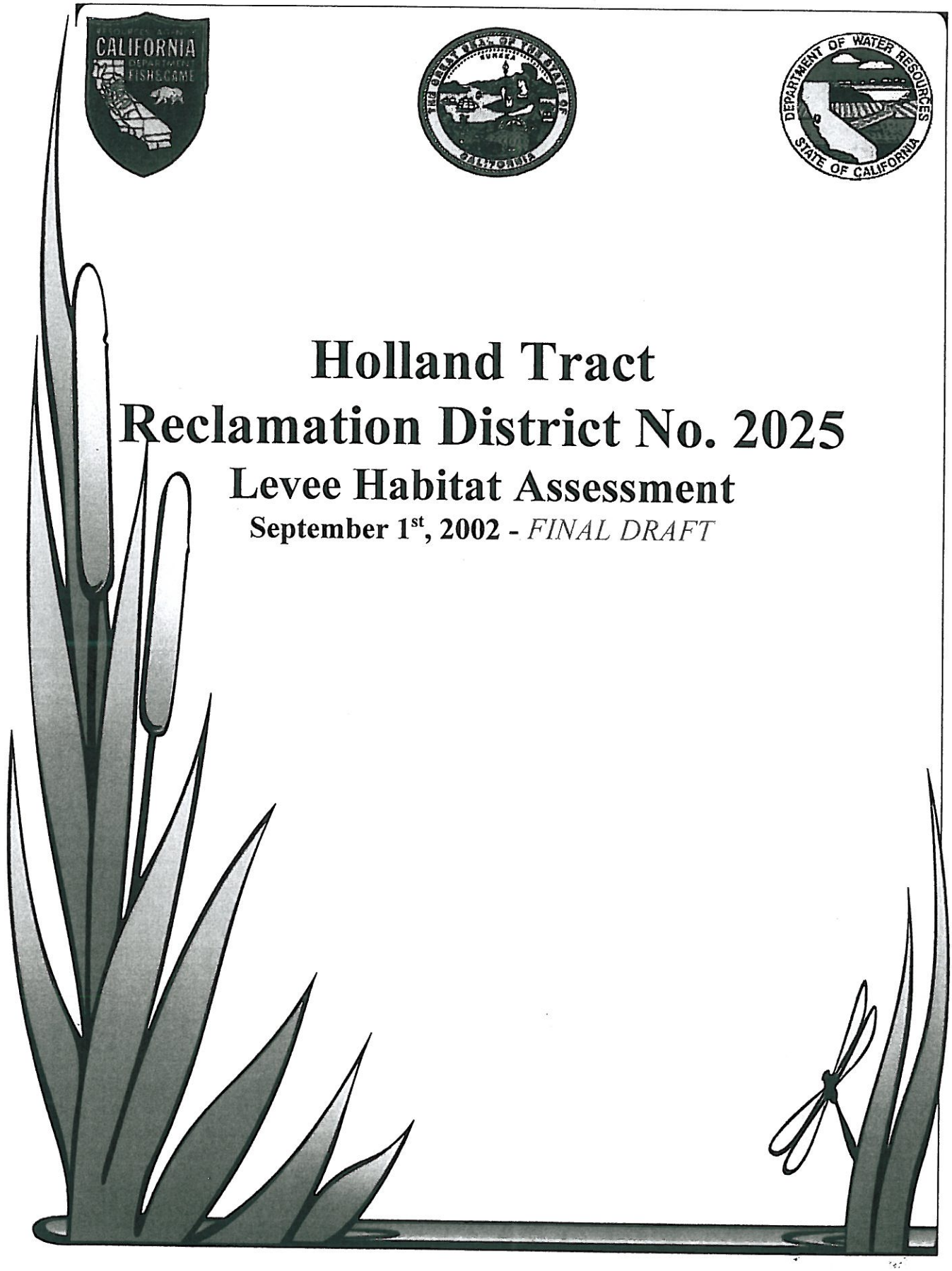
[1]Quantities are subject to final plans and specifications.

[2]Construction costs include any mitigation and enhancement proposed, and 5% annual inflation included.

[3]Allocation for engineering and environmental is 20% of construction cost.

Appendix D – Habitat Assessment

Holland Tract
Reclamation District No. 2025
Levee Habitat Assessment
September 1st, 2002 - *FINAL DRAFT*



STATE OF CALIFORNIA
Gray Davis, Governor

THE RESOURCES AGENCY
Mary Nichols, Secretary for Resources

DEPARTMENT OF FISH AND GAME
Robert C. Hight, Director

This report was prepared at the
Department of Fish and Game
Sacramento Valley and Central Sierra Region
Delta Levee Habitat Improvement Program
under the direction of

Robert E. Orcutt.....Program Manager

by

Jason Holley.....Environmental Specialist
Mark Philipp.....Wildlife Biologist

with assistance from

Paul Forsberg.....Environmental Specialist
Frank Gray.....Environmental Scientist
Kip Young.....Scientific Aide

The GIS Map was Created at
DEPARTMENT OF WATER RESOURCES - Central District
Flood Protection and Geographic Information Branch
under the direction of

Dave Mraz.....Branch Chief

by

Marc Commandatore.....Research Analyst, GIS
Jason Schwenkler.....GIC Branch, CSUS
Barry Hallman.....GIC Branch, CSUS
Erik Fintel.....GIC Branch, CSUS

Abstract: On October 19th and 21th, 1998, Delta Levee Habitat Improvement Program (DLHIP) staff from the California Department of Fish and Game (DFG), recorded levee-related fish and wildlife habitat data on Holland Tract. These observations were designed to meet, and are in accordance with, the requirements of Assembly Bill 360. While driving the levee road, a distance measuring device was used to determine location and areal extent of various habitat assemblages. Data were digitized for analysis, mapping, legibility, and future access. We found 24.4 acres of levee-related habitat on Holland Tract consisting of: 6.9 acres of Riparian Forest, 5.9 acres of Freshwater Marsh, 11.6 acres of Scrub Shrub, and 1117 linear feet of Shaded Riverine Aquatic habitat. Suisun Marsh Aster (*Aster lentus*) was the only special status species recorded. This habitat assessment consists of three parts: 1) a text overview with associated, figures, photos, and tables; 2); A GIS-generated map; and 3) a levee log which identifies habitat type and individual species, by levee station, on the land and water side of the levee.

Introduction

The Delta Flood Protection Act (SB 34) was enacted in March 1988. This legislation called for "no net loss" of riparian, fisheries, or wildlife habitat associated with program-funded levee maintenance and improvement activities. During the early years of the DLHIP, habitat assessments were conducted and maps were created for each participating Reclamation District (district) to inventory and monitor levee vegetation to ensure no net loss of habitat. Under the SB 34 program, the only documented references for district habitat changes were hand illustrated maps. These maps became difficult to interpret after several years of updates with accumulated hand annotations.

Assembly Bill 360 (chaptered in September 1996) supercedes SB 34, and requires in addition to "no net loss" that program expenditures result in "net long-term habitat improvement." To comply with this new requirement, DLHIP staff, with the assistance of Daniel Kjeldsen and engineers from Kjeldsen Sinnock & Neudeck (KSN) redesigned and improved methods to document: 1) existing habitat quantity and quality, 2) impacts of project construction, and 3) mitigation needs and compliance, and 4) habitat improvement and biological success. The use of Distance Measuring Instruments, GIS, and GPS technology described below, produce assessments that are more clear, efficient, repeatable, and are easily updated each year during field inspections.

Location

Holland Tract is located 7 miles east of Antioch and 46 miles east/northeast of San Francisco

in the western Sacramento-San Joaquin Delta (See "Study Area" on GIS map). The area's 10.9 miles of non-project levee helps protect its 4,060-acre interior. Holland is bordered to the north by Dutch slough, across which lies Bethel Island and the submerged Franks Tract (from west to east). To the east, Holland Cut and Old River separate Holland from Quimby, Little Mandeville, Rhode, and Bacon islands. Continuing clockwise to the south, Palm and Veale tracts share Rock Slough. The circle is completed by Sandmound Slough to the west which separates Hotchkiss Tract from Holland.

Methods

This area was assessed by Jason Holley (Environmental Specialist III), Frank Gray (Environmental Specialist III) and Kip Young (Scientific Aid) of the California Department of Fish and Game. Mark Fortner (District Engineer) of MBK Engineering was also in attendance during the assessment.

DLHIP staff drove counter-clockwise along the levee road and recorded the location and areal extent of four program-significant habitat types. As required by AB 360, the habitat types measured were: Shaded Riverine Aquatic (SRA), Shrub Scrub (SS), Freshwater Marsh (FM), and Riparian Forest (RF) (Table 1). These habitat types were recorded on the Field Data Collection Form following the guidelines in the Habitat Assessment Levee Vegetation Survey Form developed by DLHIP staff (Appendix A, B). All areas subject to reimbursement through the AB360 program were assessed. This typically includes both the water and landside of the levee, 30 feet landward of the landside levee toe, or 30 feet landward of the existing toe drain, whichever is greater. We also determined location and area of individual tree species. An estimate of the circular canopy area of individual trees was derived by squaring half of the height of the tree and multiplying by Pi (π) (Figure 1).

Department staff used a *Nu-Metrics Nitestar NS-60* Distance Measuring Instrument (DMI) to determine the location and linear length of habitat types. The levee road is marked with sequentially-numbered engineering station panels (station panels). We "preset" the DMI to match with the "zero" (0+00) station panel and noted where existing levee station panels varied from our DMI reading. This was done to ensure that other users of this document can easily find specific levee locations.

The DMI was calibrated using a tape-measured distance before going into the field. With the DMI we were able to accurately measure lengths of vegetation to within a few feet. Widths of

habitat tracts were estimated from actual measurements taken from both levee slopes. These measurements and subsequent estimates of habitat width are a diagonal distance (following the surface of the ground), as opposed to a horizontal projection, from levee crown to water or land side toe (Figure 2).

Although SRA habitat areas were recorded, visual obstructions made them difficult to measure accurately from land (Figure 3). Therefore, to refine and confirm the initial estimates, further investigation by boat will be needed prior to the initiation of any levee project requiring the removal of SRA.

DLHIP staff noted and photographed incidental wildlife observations and habitat relationships (Levee Log, Appendix C) during the assessment. Past incidental wildlife observations on Holland are also included in this report (Table 2). While the location and occurrence of special status flora and fauna were recorded, this assessment did not constitute a formal survey. "Special status species" refers to any species with a designated listing by the Federal Government, State Government, or recognized by the California Natural Heritage Program or the California Native Plant Society. A record of special status species occurrences rom the California natural Diversity Database (CNDDB) is referenced below (Figure 4).

Data were digitized into a spreadsheet and Geographical Information System (GIS). Barry Hallman and Jason Schwenkler from the Geographical Information Center (GIC) branch at California State University, Chico incorporated the data into a GIS format. Original GIS design was performed by Marc Commadatore (Research analyst, GIS) at the Central District of the California Department of Water Resources, Flood Protection and Geographic Information Branch. This digitized format allows efficient quantification and illustration of the data (see *GIS Map* following tables section). The map produced from the GIS is easier to read than previous hand-annotated maps. Natural and construction-related habitat changes can be readily evaluated with this system.

Habitat Results

A total of 24.4 acres of levee-associated habitat and 1117 linear feet of SRA were recorded (Table 3). Most of the habitat on Holland consisted of 11.6 acres of Shrub-Scrub. Large stands of contiguous Himalaya Blackberry (*Rubus discolor*) accounted for 91% of this habitat type.

The second most common habitat type (6.9 acres) was Riparian Forest. Willow species (*Salix exigua, S. goddingii, and S. lasiolepis*) comprise 78% of the RF on Holland. Other species noted

here were Cottonwood (*Poplus fremontii*), Walnut (*Juglans californica and J. regia*) and Elm (*Ulmus spp.*)

Freshwater marsh totaled 5.9 acres on Holland Tract. Most (60%) of this habitat type was represented by Tule species (*Scirpus spp.*). Common Reed (*Phragmites australis*) and Cattail (*Typha latifolia*) were also found associated with Holland levees.

Suisun Marsh Aster (*Aster lentus*) is the only Special Status Species identified on Holland. Because Suisun Marsh Aster is rare, threatened, or endangered in California and elsewhere, the California Native Plant Society has designated this a "list 1B" species. In addition, this aster is also Federally listed as a "Species of Special Concern". Special care is required to prevent unnecessary take of such species. For more information on Special Status Species visit the California Natural Diversity Database website at: www.dfg.ca.gov/whdab/html/cnddb.html.

References:

Anderson, S.H. and K.J. Gutzwiller, 1994. Habitat Evaluation Methods. Pages 592-606 *in* T.A. Bookhout, ed. Research and Management Techniques for Wildlife and Habitats. Fifth edition. The Wildlife Society, Bethesda, Md.

Baba, B. 1994. CEQA-Defined Rare or Endangered Plants Currently known to Occur Along the Waterways of the Sacramento-San Joaquin Delta. Unpublished guide, California Department of Fish and Game, Delta Flood Protection Program.

Hickman, J.C. ed. 1993. The Jepson Manual. Higher Plants of California. University of California Press, Berkeley.

Kjeldsen, Chris, K. And Arnold, John, R. 1991. Hotchkiss Tract Habitat Assessment. Unpublished.

National Geographic Society, Field Guide to the Birds of North America, Second Edition, RR Donnelly and Sons. 1987.

State of California, The Resources Agency, Department of Fish and Game, Natural Diversity Database. January 1999. Special Plants List. 119p.

State of California, The Resources Agency, Department of Fish and Game, SB 34 Delta Levees Master Environmental Assessment. October 1995.

State of California, The Resources Agency, Department of Water Resources, Sacramento-San Joaquin Delta Atlas. August, 1987.

TABLES

Table 1. Defining habitat significant to the AB 360 program assessment procedures

Definitions of AB 360 - Significant Habitat Types	
Shaded Riverine Aquatic (SRA):	This habitat is the unique, near-shore aquatic area occurring at the interface between Delta channels and levees. The primary characteristic (and the one most commonly measured) is the presence of woody shoreline vegetation overhanging the water and creating shade. Other characteristics which may or may not be present, but which nearly always increase habitat values include: (a) live or dead woody vegetation protruding into or out of the water; (b) leaves, twigs, or other detritus accumulation; and (c) naturally eroding banks. *No direct Cowardin counterpart.*
Scrub Shrub (SS):	This includes woody trees, shrubs, and vines (alder, willow, wild rose, buttonbush, box elder, etc.) predominantly less than 20 feet tall. *The counterpart in the Cowardin system is PSS1 (Palustrine Scrub Shrub).*
Freshwater Marsh (FM):	This occurs along tidal or non-tidal freshwater marshes. Freshwater marsh may be on the waterside toe of the levee. It typically occurs in the slowest moving waters where tules have become established. The presence of tules or other vegetation in Delta channels should be noted if they may be adversely impacted by levee maintenance activities. *The counterpart in the Cowardin system is L2EM1 (Lacustrine Emergent Wetland), L2EM2 (Lacustrine Emergent) and R2EMI (Riverine Emergent Wetland).* Freshwater marshes may also be behind levees where there are seeps or toe ditches. This plant community typically includes cattails, common reed, etc. *This is represented as PEM1 and PEM2 (Palustrine Emergent Wetland) under the Cowardin system.*
Riparian Forest (RF):	This includes woody plants (including isolated trees or shrubs) greater than 20 feet tall. Often there is a dense, shrubby understory. *The counterpart in the Cowardin system is PFO1 (Palustrine Forest).*

Table 2: DFG Wildlife Observations at Holland tract

Bird Species	**Scientific Name**	**Date**	**Notes**
Cooper's Hawk*	*Accipiter cooperii*	12/2/97	In flight
Great Blue Heron	*Ardea herodias*	12/2/97	
American Bittern	*Botaurus lentiginosus*	12/2/97	
Loggerhead Shrike	*Lanius ludovicanus*	12/2/97 and 1/12/99	
House Finch	*Carpodacus mexicanus*	12/2/97	
Double-Crested Cormorant*	*Phalacrocorax auritus*	1/12/99	
Common Snipe	*Gallinago gallinago*	1/12/99	

*Species of Special Concern

Cooper's Hawk is listed as Ca-CSC (CA Dept. of Fish and Game "Species of Special Concern")

Double-crested Cormorant is listed as Ca-CSC

Mammals	**Scientific Name**	**Date**	**Notes**
Beaver	Castor canadensis	1/12/99	Dead

Table 3. Habitat Assessment Results for Holland Tract. Contra Costa County October 1998.

Habitat Type	Length	Square Feet	Acres
FM	11997.0	257950.3	5.9
SS	3676.0	505425.8	11.6
RF	3338.0	299769.4	6.9
SRA	1117.0	-	-
Total	20128.0	1063145.5	24.4

*SRA is inventoried in linear feet only

FIGURES

Figure 1: Height-width dependant equations for finding individual tree areas.

EXAMPLE OF A 30' HIGH TREE WITH VARIOUS HEIGHT-WIDTH RATIOS

SIDE PROFILE	AERIAL VIEW	DESCRIPTION
		1:1 **Area of Example = 70 6.85 ft²* Current formula = $[\pi(^1/_2\text{Height})^2]$

*Assume: Area of individual tree canopy is a circular = $[\pi r^2]$

Figure 2. Habitat width measured using a diagonal projection.

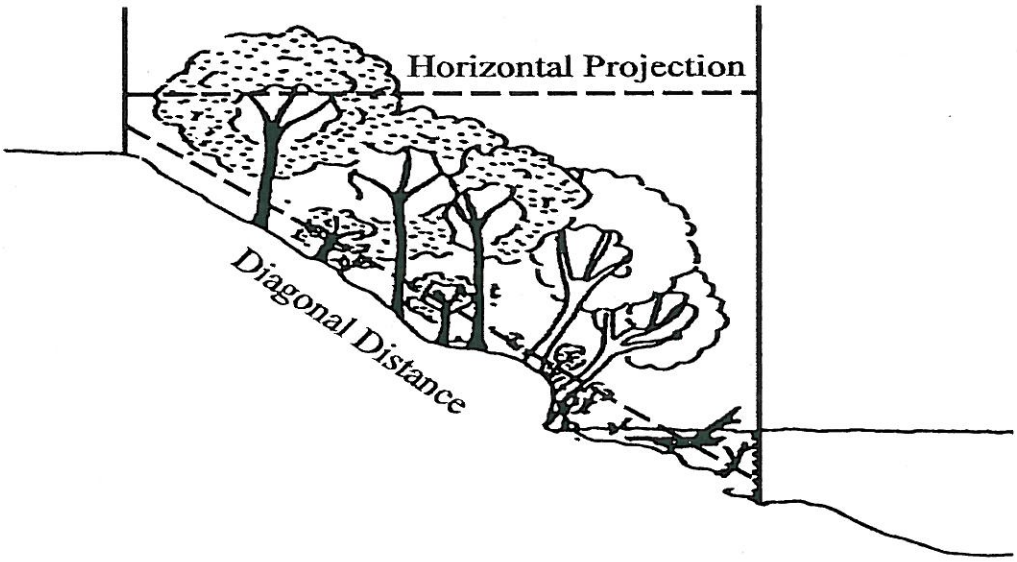
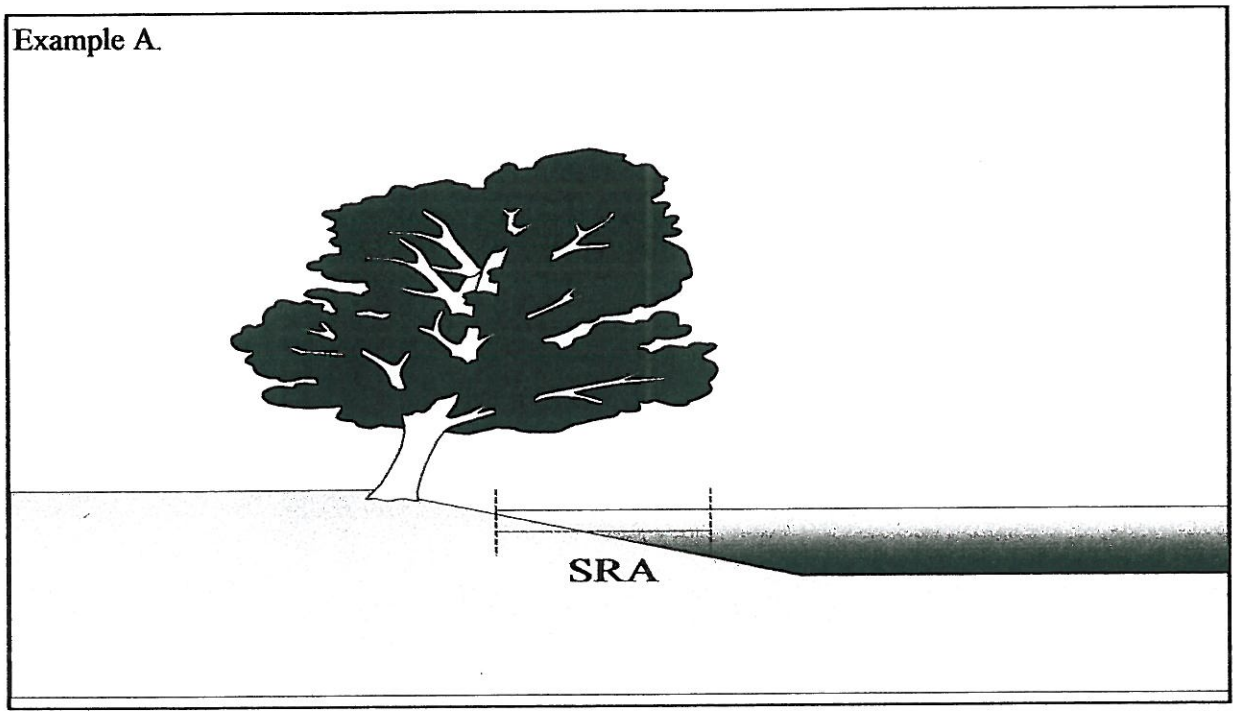


Figure 3. Typical examples of Shaded Riverine Aquatic (SRA) habitat. Example A has only the overhead shade component. Example B has both overhead shade and in-water cover components. The various components must be evaluated to determine overall SRA value at any given site.



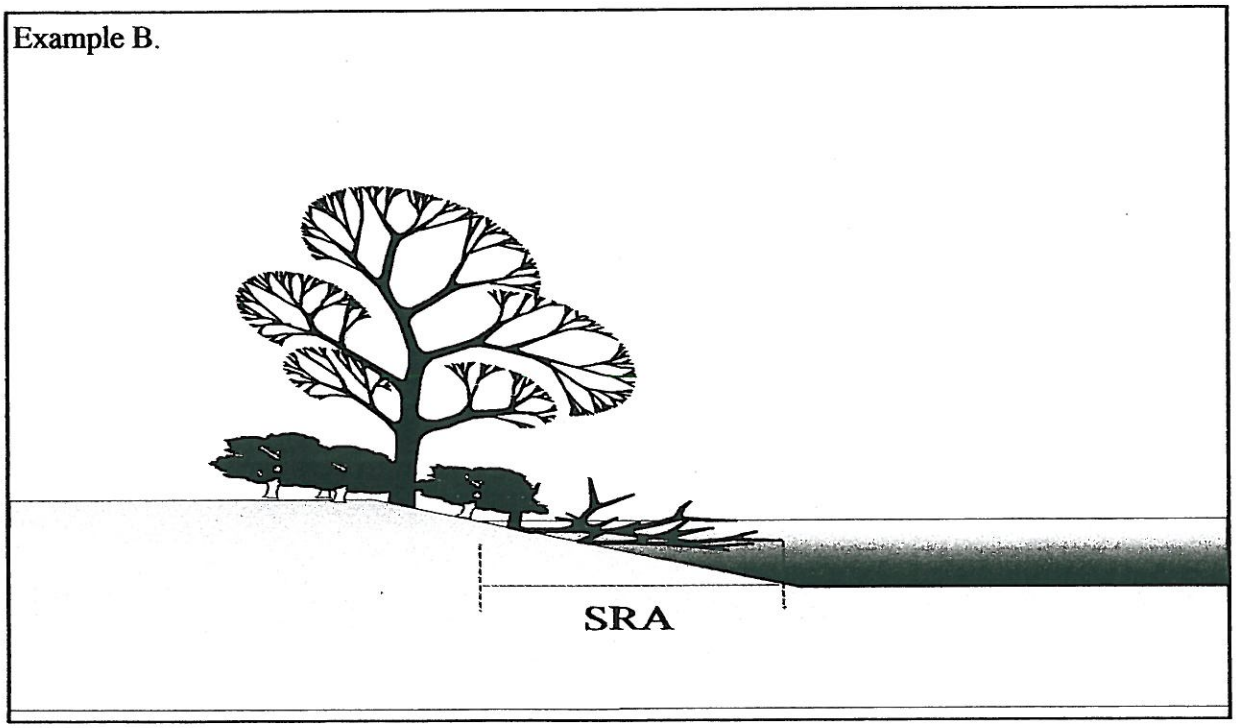
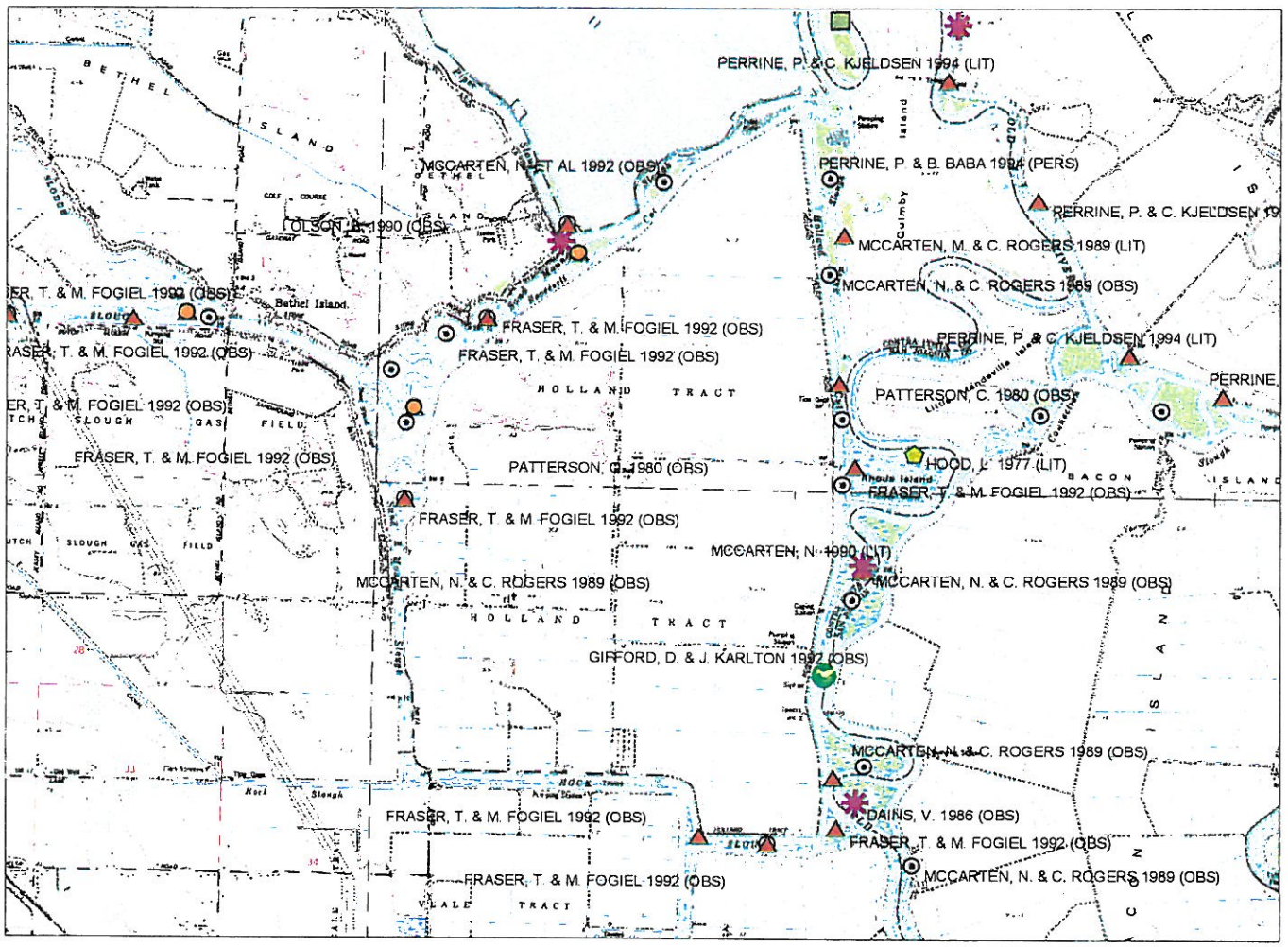


Figure 4. A Record of Special Status Species Observations Related to Holland Tract

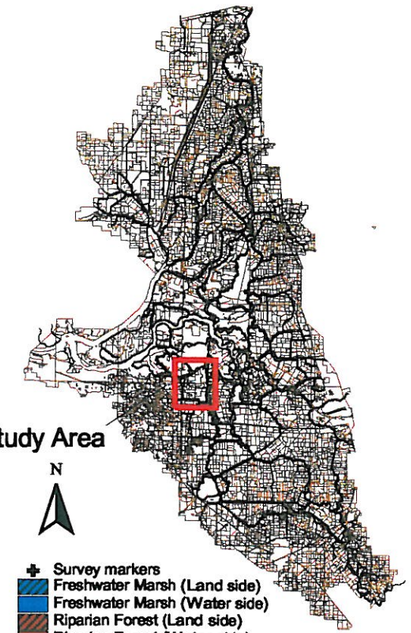


AB-360 Program 10/00. Data from California Natural Diversity Database (CNDDB). Points represent approximate center of occurrence area.

GIS MAP

Habitat Map - 1998
Reclamation District No. 2025
Holland Tract

Sacramento - San Joaquin Delta



- Survey markers
- Freshwater Marsh (Land side)
- Freshwater Marsh (Water side)
- Riparian Forest (Land side)
- Riparian Forest (Water side)
- Shrub Scrub (Land side)
- Shrub Scrub (Water side)
- Urban (Land side)
- Urban (Water side)
- Shaded Riverine Aquatic

1. The location of Station 0+00 is Latitude 37.9825, Longitude -121.5816

2. This map shows the location of the various habitat types associated with the levees. The lengths of the habitat areas are accurate but the widths have been exaggerated by 10 times.

3. Single trees were not mapped due to scale, but were recorded during this assessment.

Department of Water Resources, Central District
In cooperation with Department of Fish and Game
AB-360 Program

Source: California Department of Fish and Game
Habitat Assessment - Reclamation District No. 2025
Holland Tract
1998

1000 0 1000 2000 3000 4000 Feet

LEVEE LOG

Levee Log for Holland Tract (10/20/98)

Key to Levee Log: Side: Water (W) or Land (L) side of levee. Station Begin/End: DMI readings (feet from panel station zero). Height: Height of individual tree or average height of a linear strip of habitat. Width: Average width of a linear strip of habitat. Habitat Type: See *Table 1* for definitions. Species: Dominant species present for a said habitat type. Length: Length of habitat type (canopy edge to canopy edge). Notes: Other observations, habitat cover percentage, photo log, DMI/stationing panel descrepancies.

SIDE	Station Begin	Station End	Length	Height	Width	Habitat Type	Species	Notes
W	1110	1135	25		5	FM	PHAU	PHOTO #1 PHAU, #2 IS TYPICAL LANDSIDE HAB.
L	1125	1125	0	40		RF	SAGO	RAB 000+00-400
L	1366	1425	59	20	30	RF	SAGO	
L	1446	1621	175	20	25	RF	SAL	1 50FT. POFR AT END
W	1925	2013	88	20	15	RF	JUCA	5 TREES TOTAL
W	1997	2013	16		15	SRA	JUCA	
L	2366	2453	87	40	15	RF	POFR	ASLE is the abbreviation for Suisun Marsh Aster
W	2497	2497	0			SSC	ASLE	
W	2658	2937	279		15	FM	PHAU	ARRUNDO PATCH W/BLPH
W	3163	3207	44		10	FM	PHAU	
W	3823	4071	248		10	FM	PHAU	
W	4720	4806	86	15	15	SS	SAME	OVERHANGING H20 @ HIGH TIDE. >1"DIA.
W	4849	4883	34		10	FM	PHAU	
L	5030	5064	34		10	FM	PHAU	
W	5086	5531	445		10	FM	PHAU	10% COVERAGE
L	5656	5706	50		10	FM	PHAU	5% COVERAGE
W	6727	6939	212		5	FM	PHAU	15% COVERAGE
W	6939	7114	175		10	SS	SAL	MOSTLY DEAD (75%)
W	7737	8037	300		10	FM	PHAU	15% COVERAGE
W	8105	8105	0			SSC	ASLE	
W	8720	8720	0	15	10	RF	UNID	OREGON ASH?
L	10221	10221	0	20	10	RF	SAGO	RUDI UNDER TREE
W	10975	11122	147		5	FM	TYLA	AT 104+93 MORRIBOUND ARRUNDO
W	12221	12352	131		5	FM	SCR	40% COVERAGE
L	12434	12536	102	45	20	RF	SAGO	
W	12652	12750	98		10	FM	SCR	TYLA LANDSIDE (10FT); RAB WATERSIDE
L	12652	12652	0	25		RF	SAGO	FROM 127+50-132+78, RUDI IN SEEP DITCH
W	12890	12947	57		5	FM	SCR	55% COVERAGE
L	13228	13278	50	30		RF	SAGO	
W	13556	13556	0	10		SS	JUCA	
L	13589	13706	117	50	15	RF	ULM	RF ENDS W/ORNAMENTALS
W	13625	13625	0	20		RF	ULM	
W	13657	13657	0	20		RF	ULM	
W	13696	13696	0	20		RF	ULM	URBAN SHRUBBY LEGUME; PHAU @ END
W	13713	13795	82	3	5	URBAN	UNID	
W	14211	14375	164		10	FM	SCR	85% COVERAGE ; RAB WATERSIDE
W	14468	14954	486		15	FM	SCR	
L	15071	15071	0	10		SS	SAL	
L	15180	15180	0	15		SS	SAL	PHOTO #3 (LOOKING NORTH) -TYPICAL LANDSIDE
W	15422	15539	117		15	FM	SCR	ARRUNDO HERE
L	15568	15568	0	20		RF	SAL	
L	15672	15760	88	50	50	RF	SAL	
L	15760	16305	545			FM	TYLA	

LEVEE LOG

SIDE	Station Begin	Station End	Length	Height	Width	Habitat Type	Species	Notes
L	15819	15819	0	25		RF	SAL	10% COVERAGE
L	15971	16050	79	40	15	RF	SAL	
W	16107	16107	0		10	FM	SCR	RUDI TO 16300
L	16107	18618	2511	50	20	RF	SAL	FM THROUGHOUT UNDERSTORY
W	17080	17212	132		10	FM	SCR	WOOD DUCKS @ 181+42 ON POND
L	18869	19001	132		10	FM	TYLA	
L	18918	18918	0	40	15	RF	SALA	
W	19127	19360	233	10	10	SS	SAEX	SOME ARRUNDO
W	19360	19374	14	10	5	SSC	CEOC	
W	19526	19564	38	10	5	SSC	CEOC	FM & RUDI SPORRATIC THROUGHOUT SEEP DITCH
L	20244	20291	47	40	30	RF	SAL	
W	22723	22723	0			SSC	CEOC	
L	23556	23598	42	10	15	SS	SAL	4 TREES (RAB ON H20 SIDE)
L	23803	23839	36	15	15	SS	SAL	
L	23875	24112	237	50	35	RF	SAL	1 60FT. POFR
L	24138	24265	127	15		SS	SAL	7 TREES ALONG SEEP-FM THOUGHOUT
W	25080	25223	143	10	10	SS	SAEX	10% COVERAGE
L	25294	25294	0	15	10	SS	SALA	
W	25324	25360	36		10	FM	SCR	
L	25465	25465	0	15	10	SS	SALA	TREE IN SEEP
L	25557	25647	90	15	10	SS	SALA	IN SEEP
L	25731	25790	59	15	10	SS	SALA	
L	25864	26065	201	20	30	RF	SAGO	ONE 60 FT.
W	26130	26151	21		5	FM	SCR	
L	26391	26391	0	30		RF	SAL	
W	26416	26480	64		5	FM	SCR	
L	26433	26485	52	30		RF	SAL	RUDI ON WATER SIDE
L	26618	26707	89	20		RF	SAL	
L	26766	26814	48	20		RF	SAL	
W	26766	26872	106	15		SS	SAEX	RUDI THROUGHOUT
L	26911	28492	1581			FM	SCR	SOME PHAU
W	26911	27172	261			SS	SAEX	RAB
W	27273	27315	42			FM	SCR	
L	27273	27481	208	40		RF	SAL	PHAU WATERSIDE
L	27548	27639	91	30		RF	SAL	
L	27742	28538	796	40		RF	SAL	DMD READS 27950 @ 28000 (-50 ft to DMI)
W	28173	28938	765			SRA	SAEX	PHOTO #4; 20% COVERAGE
W	28173	28438	265	15	15	SS	SAEX	85% COVERAGE
W	28264	29319	1055		10	FM	SCR	
W	28614	28709	95		10	FM	SCR	15% COVERAGE
L	28709	28709	0	40		RF	SAL	END OF RUDI
W	29026	29202	176	15	10	SS	SAEX	CEOC THROUGHOUT SS
L	29480	30068	588	20	15	RF	SAL	6 TREES
L	29671	30068	397		20	FM	PHAU	
W	29817	29911	94	30	15	RF	SAEX	1 40FT. JUCA
W	30158	30410	252		10	FM	SCR	RAB; 80% COVERAGE
W	30787	30849	62	10	10	SS	SAEX	
W	30960	31041	81	15		FM	SCR	
W	31117	31398	281	15	15	SS	SAEX	

SIDE	Station Begin	Station End	Length	Height	Width	Habitat Type	Species	Notes
W	31398	31435	37		10	FM	SCR	
L	31483	31559	76	55		FM	SAL	
W	31561	31621	60		10	FM	SCR	
W	31621	32172	551	20	15	RF	SAEX	
L	31787	31787	0	50		RF	SALA	
W	31938	32029	91		10	FM	SCR	
L	32204	32265	61	20	15	RF	SAL	
W	32298	32841	543	10		SS	SAEX	SOME SCR
L	32807	32807	0	40		RF	SALA	
L	32872	34388	1516		40	FM	PHAU	SOME TYLA&SCR @ END
W	33025	33099	74	15		SS	SAEX	
W	33166	33182	16		10	FM	SCR	RAB-WATERSIDE
L	33210	33210	0	25		RF	SAGO	
L	33386	33414	28	25		RF	SAGO	
L	33451	33639	188	20		RF	SALA	SOME SAEX&SCR
L	33680	33842	162	30		RF	SALA	
W	33937	33993	56		5	FM	SCR	
L	33949	34388	439	30		RF	SAL	SALA,SAGO,SAEX
W	34204	34498	294		15	FM	SCR	
L	34411	34411	0	25		RF	JUCA	
L	34470	35589	1119		10	FM	TYLA	SOME SCR IN SEEP
W	34590	34936	346		20	FM	SCR	80% COVERAGE
L	34967	34967	0	15	15	SS	SAGO	
W	35023	35742	719		15	FM	SCR	SOME RUDI
L	35023	35023	0	35		RF	SAGO	
L	35147	35394	247	30	20	RF	SAL	
L	35454	35454	0	45		RF	SAL	
L	35523	35523	0	45		RF	SAL	
W	35578	35880	302		15	FM	SCR	
W	35742	35778	36	20	15	RF	JUCA	
W	35742	35753	11			SRA	JUCA	
W	35880	35897	17	35		RF	ACNE	
W	35880	35897	17			SRA	ACNE	THE DMD IS 70 FT UNDER AT PANEL 360+00
W	35890	35890	0	40	25	RF	ACNE	
W	35931	36083	152		15	FM	SCR	
W	36055	36135	80			FM	TYLA	
W	36103	36103	0	40		RF	SAL	
L	36138	36138	0	30		RF	SAL	
L	36225	36225	0	50		RF	SAL	
L	36269	36269	0	40		RF	SAL	FM IN SEEP
W	36615	36789	174		10	FM	SCR	
L	36622	36622	0	70		RF	POFR	
L	36746	37186	440	45		URBAN	OFR/ORN	80 FT. POFR; PALMS ;FRLA
L	37277	37917	640		15	FM	SCR	ALONG SEEP
L	37434	37434	0	20		RF	SAL	
W	37481	37610	129		10	FM	SCR	10% COVERAGE
W	37640	37655	15			SRA	SAL	
W	37640	37655	15	15	10	SS	SAL	
W	37812	37917	105		10	FM	SCR	

SIDE	Station Begin	Station End	Length	Height	Width	Habitat Type	Species	Notes
W	37917	37917	0	15		SS	ORNA	RAB
L	38042	38129	87		20	FM	PHAU	
L	38265	38471	206		10	FM	SCR	IN SEEP DITCH
W	38388	38388	0	30		RF	JUCA	SRA HERE
L	38471	38471	0		10	FM	SCR	IN SEEP DITCH
W	38509	38509	0	15		RF	JUCA	SRA HERE
W	38791	38791	0	20	10	RF	UNID	
L	38860	42785	3925		10	FM	SCR	
W	38860	39153	293	30	20	RF	SAEX	
W	38860	39153	293			SRA	SAEX	
W	39313	39313	0	25		RF	JUCA	SRA HERE (10FT.)
W	39691	39691	0	20		RF	EUK	SRA HERE (15FT.)
L	40508	40539	31	15	10	SS	SAEX	
W	40534	41055	521			FM	SCR	
L	40534	40893	359	20		RF	SAL	
W	40534	40782	248	20		RF	SAEX	
L	40942	41069	127	40		RF	SAL	
W	41072	41072	0	25		RF	JUCA	
W	41385	41385	0	60		RF	JURE	SRA
L	41435	41435	0	30		RF	SALA	
L	41478	41553	75	25		RF	SALA	NEAR SEEP DITCH
L	41612	41612	0	20		RF	SAL	NEAR SEEP DITCH
W	41658	41845	187	10	5	SS	SAEX	
L	41704	41704	0	20		RF	SAL	ON URBAN LAWN
L	41858	41900	42	20		RF	SAL	
W	41900	42011	111	20		RF	SAEX	
L	41966	41966	0	25		RF	SALA	
W	42109	42190	81	20		RF	SAEX	
W	42222	42222	0	15		SS	SALA	ON TRILOCK IN BASKET
L	42222	42540	318	20		RF	SAL	50% COVERAGE
W	42320	42357	37	10		SS	SALA	ON TRILOCK ; RAB PRESENT
W	42686	42845	159	15		SS	SAEX	
L	42686	42785	99	15		SS	SAL	
L	42962	42962	0	60		RF	ULM	
W	43308	44623	1315			FM	SCR	URBANIZED DOCK ON WATER SIDE
L	43308	43569	261	50		RF	SAL	6 WILLOWS-1 IN SEEP; 10+ ORNAS
L	43569	44623	1054			URBAN	ORNA	
W	44623	44731	108	15		SS	SAEX	SEEP DITCH FM
W	45117	45476	359	65		RF	POFR	85% COVERAGE ; SOME SRA; RAB PRESENT
L	45666	46322	656			RF	POFR	SAL TOO; 18 TREES TOTAL
W	45794	45982	188		10	FM	SCR	
W	45794	45794	0	35		RF	SAL	
W	46730	47242	512	55	25	RF	POFR	20%; SOME SRA; ASLE ON PILINGS
L	47176	47176	0	20		RF	SAL	
W	47497	47605	108		10	FM	SCR	
W	47675	47971	296	40		RF	JUCA	15% COVERAGE
L	48016	57250	9234		50	SS	RUDI	PHOTO#5 FROM 559+95 LOOKING NORTH
L	48191	48191	0	20		RF	SAL	

SIDE	Station Begin	Station End	Length	Height	Width	Habitat Type	Species	Notes
W	48254	48306	52		5	FM	TYLA	
L	48306	48514	208	60		RF	POFR	50% COVERAGE
W	48404	49168	764		15	FM	SCR	
L	48802	48802	0	40		RF	POFR	
L	48915	48915	0	40		RF	POFR	
W	49122	49122	0	15		SS	SAEX	
L	49168	49368	200	30		RF	POFR	
L	49544	49624	80	30		RF	SAL	
L	49671	49792	121	15		RF	SAL	50% COVERAGE
L	49856	49931	75	40		RF	SAL	RAB
L	50018	50217	199	30		RF	SAL	RAB
W	50481	50609	128	15		SS	SAEX	
W	50742	50892	150		5	FM	SCR	
W	51060	51425	365		5	FM	TYLA	40% COVERAGE
L	51060	51083	23	70		RF	POFR	FROM 51083-53520 5% FM
W	51425	51514	89	20		SS	SAL	
W	51558	51642	84	15		SS	SAL	
L	51583	52066	483	70		RF	POFR	
W	51734	51734	0	45		RF	SAL	
W	51959	51959	0	40		RF	SAL	
W	52078	52176	98	20		RF	SAL	
W	52285	52314	29	20		RF	SAL	
W	52503	52623	120	20		RF	SALA	2 TREES
W	52689	52883	194	35		RF	SAL	1 ORNAMEANTAL
L	52732	52778	46	50		RF	POFR	
W	52956	52956	0	50		RF	SAGO	
W	53076	53076	0	20		RF	SALA	
W	53219	53219	0	45		RF	JUCA	
L	53248	53248	0	60		RF	POFR	
W	53302	53387	85	45		RF	SAL	ORNAMENTALS TOO
L	53535	53535	0	50		RF	POFR	
W	53578	53578	0	50		RF	SAL	
W	53591	54195	604		10	FM	PHAU	SOME TYLA&SCR
L	53658	54195	537	50		RF	SALA	15% COVERAGE; POFR
W	54304	55015	711		15	FM	SCR	
L	54441	55397	956	70		RF	POFR	
W	55360	55453	93		10	FM	SCR	
L	55478	55614	136	30		RF	POFR	15% COVERAGE; 3 TREES
L	55995	56222	227	20		RF	SALA	THE DMD IS 70 FT. UNDER @ 560+00
L	56409	56940	531	30		RF	SAL	1 POFR @ START
								END @ 578+60=000+00

Document Subject to Change or Revision Without Notice

APPENDICES

DEPARTMENT OF FISH AND GAME
HABITAT ASSESSMENT LEVEE VEGETATION SURVEY FORM

Reclamation District: _____

Date of Inventory: _____

Conducted by: _____

Levee System Distance (Project, Nonproject, or Both): _____

Location of Engineering Station 0+00 and end of District: _____

Location of Survey (Beginning and Ending Engineering Stations): _____

The following guidelines are for use with the attached Field Data Collection Sheet. Please refer to the Habitat Assessment Requirements in the Outline of AB 360 Required Habitat Information for further information.

1) Use this form to record plant species on and adjacent to levees. Include any woody, freshwater marsh, or riverine aquatic bed vegetation which has the *potential* to:
   i) be affected by levee maintenance activities.
   ii) provide fish and/or wildlife habitat.
   Include levee-related vegetation which could be affected by AB 360 funded activities. This typically includes vegetation 30 feet landward of the landside levee toe, or 30 feet landward of existing toe drain. Also record locations of giant reed in the "notes" section of the Field Data Collection Sheet.
2) Note habitat type as defined in the SB 34 MEA - Section VI. Shaded Riverine Aquatic (SRA), Riparian Forest (RF), Scrub Shrub (SS), and Freshwater Marsh (FM). Riverine Aquatic Bed (RAB) shall be qualatatively noted when readily observed during assessment.
3) Note location and species of *individual trees* by engineering station. Note start and end of *canopy* cover if a *continuous* linear strip of trees/shrubs exist. A linear strip of habitat shall not be considered *continuous* if a break of greater than 25 feet occurs, or if there is a significant change in stand Height, width, or species composition. Identify representative species within habitat type. Note any recently cut trees or shrubs. FM may be noted as *discontinuous* when numerous small (under 25 feet) habitat breaks occur. Estimate percent coverage for *discontinuous* linear strips of FM.
4) Include both measured length and estimated width (by 5-foot increments) of habitat strips. "Calibrate" your estimation of levee width with an initial measurement from crown to toe.
5) Estimate tree height by 5-foot increments. Minimum height to record is 10 feet, unless stands less than 10 feet exist greater than 30 feet long.
6) Record domestic property as *urban*. Delineate as linear strip including structures and altered areas. Note general habitat conditions if applicable.
7) Include photo locations and general /incidental observations (including birds and mammals) under "Notes."
8) Although not a T & E species survey, record any observed T & E species. See SB 34 MEA Appendix F for special status species distribution by Reclamation District.

Commonly used Species Codes*

California box elder	*Acer negundo*	ACNE	Coast live oak	*Quercus agrifolia*	QUAG
White alder	*Alnus rhombifolia*	ALRH	Valley oak	*Quercus lobata*	QULO
Giant reed	*Arundo donax*	ARDO	Interior live oak	*Quercus wislizenii*	QUWI
Sedge species	*Carex* sp.	CAR	Black locust	*Robinia pseudoacacia*	ROPS
Calif. button bush	*Cephalanthus occidentalis*	CEOC	Himalaya blackberry	*Rubus discolor*	RUDI
American dogwood	*Cornus sericea*	COSE	Willow species	*Salix* sp.	SAL
Pampas grass	*Cortaderia selloana*	COSE	Sandbar willow	*Salix exigua*	SAEX
Nutsedge sp.	*Cyperus* sp.	CYP	Godding's black willow	*Salix goddingii*	SAGO
Eucalyptus species	*Eucalyptus* sp.	EUC	Arroyo willow	*Salix lasiolepis*	SALA
Edible fig	*Ficus carica*	FICA	Shining willow	*Salix lucida*	SALU
Oregon Ash	*Fraxinus latifolia*	FRLA	Bulrush sp.	*Scripus* sp.	SCR
Black walnut	*Juglans californica*	JUCA	Tule	*Scirpus acutus*	SCAC
English walnut	*Juglans regia*	JURE	California tule	*Scirpus californicus*	SCCA
Rush	*Juncus* sp.	JUN	Blue elderberry	*Sambucus mexicana*	SAME
Western sycamore	*Platanus racemosa*	PLRA	Cattail	*Typha latifolia*	TYLA
Fremont cottonwood	*Poplus fremontii*	POFR	Unidentified sp.	*Unidentified sp.*	UNID
Common reed	*Phragmites australis*	PHAU	Elm species	*Ulmus* sp.	ULM

* Species codes utilize: the first two letters of the genus and the first two letters of the species. Additional variety and subspecies codes letters are not used on this form since there is very little overlap of plant varieties and subspecies in the Delta. If the specific species is not known, then first three letters of the genus are used. The UNID code is used if no positive identification of the plant can be made (i.e. ornamentals).

Page_____of_____

Levee Side	Engineering Station		Estimated		Habitat Type	Species Code	Notes
	Beginning	Ending	Height (H)	Width (W)			

Appendix C. Holland Tract Habitat Assessment Photos

Above: Himalayan Blackberry on landside.

Above: Mark Fortner of MBK inspects a stand of Blue Elderberry at station 47+20.

Above: SRA w/ branches entering the water.

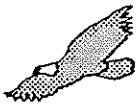
Above: "Managed" Phragmites on east side of tract.

Above: Fire management of levee vegetation

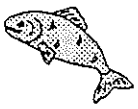
Above: More east side fire management.

Above: "Tri-lock" levee stabalization being used on the south side of Holland.

Above: Oak plantings near the "Tri-lock" area.



L & L FARMS



MEDFORD ISLAND
STOCKTON, CALIFORNIA

VIA FAX 916-355-7102

January 16, 1991

State of California
Department Fish & Game
Attn: Scott Clemons

Dear Mr. Clemons:

It is the intent of L & L Farms ownership to engage in the restoration, enhancement and protection of wetlands, riparian and aquatic habitat values on Medford Island for the benefit of all wildlife including sensitive plant and animal species.

To facilitate funding for these major habitat improvements, it is hoped the department will approve Medford Island as an acceptable location for mitigation projects.

The attached mitigation plan outlines the development of approximately 100 acres in the S.E corner of the island as a pilot project, for the Medford Island natural community conservation planning area mitigation site. We would also be willing to utilize this pilot project as a subventious program habitat restoration demonstration area so other districts could learn to incorporate wildlife habitat improvement into their construction activities. It would also provide other districts with a mitigation alternative which would not require acquisition, development, or maintenance on their part.

Development

It is already late winter and the window of opportunity for cost effective riparian restorations only extends for a couple of months longer. Expensive container plantings with irrigation systems could extend the planting season but in our experience the planting or cuttings from willows and cottonwoods supplemented by container plantings of elderberry and wild grape, all irrigated by fluctuating adjacent wetland water levels have provided the most benefit for the least cost. With that window of opportunity time is of the essence.

Most earthmoving and water control structures are already in place. Development of the precise character of the wetlands portions of the project will be controlled by utilizing water management techniques providing sufficient inundation to produce a palustrine emergent wetland dominated by stands of perennial rooted herbaceous plants, primarily roundstem bullrushes and cattails. Other typical moist soil plants will include smartweed and watergrass.

Specific details regarding the sale of a conservation easement, establishment of a maintenance annuity and development of a monitoring and maintenance plan will require additional negotiations between the island's ownership and R.D. 2041 to incorporate department recommendations as to the precise structure of the joint venture and subsequent operations agreement requirements identified during our continued consultations.

Field planting would begin immediately. If the department is willing to document the applicability of those improvements as mitigation for the offsite impacts of other reclamation districts or organizations who as a result of SB-34 participation or other permit process requirements were required to mitigate the impact of their activities.

Such negotiation will begin upon conceptual approval of the general plan by the department. We request an opportunity to consult with you after your review of the draft so we may incorporate your recommendations and address any concerns before a final plan is submitted.

Yours truly,

EARL COOLEY
Facility Manager

EC/jkr
Enclosures

CC: J.F. Riedel
C.A. Luckey
Dave Brown, Dept. of Water Resources
Medford File
E.C. M/B

MITIGATION PROJECT AREA DESCRIPTION

Medford Island is a 1,200 acre island centered in the Delta (see attached map). Small grain production and grazing have historically been the major land uses. Winter flooding of cereal grain production fields provides a significant waterfowl wintering area. The island is home to a number of sensitive plant and annual species.

The proposed mitigation sites consist of Unit A composed of 42.8 acres in field 24 and 20 acres in field 23.

Units A & B were proposed as potential mitigation project sites as early as 1988. In 1989 in cooperation with C.W.A. and the island's ownership entered into a one year agreement to actively manage those fields in Unit A for the benefit of waterfowl. This experimental plot was flooded that winter and left fallow the next year. In 1990 it was proposed as subventions program mitigation site. In 1991 corn was planted and left standing as a conservation feed plot for the benefit of wintering waterfowl. Some experimental planting of moist soil plants were done to evaluate different restoration techniques. This experimental plot will be put back into commercial row crop production this year if a conservation easement sale cannot be negotiated.

Unit B

45.7 acres contained in Field 25. This field was last farmed in 1989 and has been used as a reclamation district borrowing area for the subvention program levee rehabilitation activities.

The result has been a reconfiguration of the area through excavation that could, if property developed, produce characteristics of a palustrine emergent wetland with scrub shrub plantings maturing into palustrine forests values. This location would optimize moist soil plant diversity by creating non-uniform water depth that would discourage monotypic stands of emergent vegetation and increase the edge effect associated with riparian restorations. This area would most likely be leveled for ag production unless a mitigation project is approved for this location.

STATE OF CALIFORNIA—THE RESOURCES A ICY PETE WILSON, Governor

DEPARTMENT OF FISH AND GAME
REGION 2
1701 NIMBUS ROAD, SUITE A
RANCHO CORDOVA, CALIFORNIA 95670
(916) 355-7020

RECEIVED
AUG - 8 1991

August 6, 1991

Mr. John L. Winther
P.O. Box 1267
Lafayette, California 94549

Dear Mr. Winther:

This letter is regarding your recent written proposal (letter of July 16, 1991) and subsequent telephone conversations with Mr. Jerry Mensch concerning mitigation for levee work on Bouldin Island, Holland Tract, and Webb Tract. Mitigation proposals involve 1) expanding the planned Harbor Cove Project mitigation area on Empire Tract, or 2) developing new habitat on the interior of Rindge Tract, Medford Island, or some other area. You have proposed that this habitat be created to replace the long-term losses of wetland habitat on the three islands caused by past and future levee work funded by the Delta Flood Protection Act of 1988, and to satisfy the mitigation requirements of the two pending Corps 404 permits for work planned on Holland Tract (Public Notice No. 10195) and Webb Tract (Public Notice No. 9001104).

We agree with the concept of creating wetland habitat on Empire Tract or an alternative location as mitigation for long-term losses of freshwater marsh and 404 jurisdictional wetland habitat caused by levee work on Bouldin Island, Webb Tract, and Holland Tract. We believe these mitigation alternatives will also satisfy the wetlands mitigation requirements for the pending Corps 404 permits on Webb Tract and Holland Tract. However, upon review of our field inspection records, comprised of notes, photographs and videotapes (including the videotape you prepared in August of 1989), and the Habitat Assessments prepared to date by RES Associates for Bouldin Island and Webb Tract, we have determined that the proposed off-site wetlands mitigation will not be adequate to replace all of the habitat types affected by levee improvement and maintenance on the islands. For example, Shaded Riverine Aquatic habitat occurred on Webb Tract along Fisherman's Cut in August of 1989. Based upon the available information, we have estimated the net long-term loss, in acres, for each habitat type found on the three islands. Those estimated losses are summarized below:

	Scrub-shrub	Freshwater marsh	Riparian forest	Shaded Riverine Aquatic	Ruderal
Boul	H(? ac.)	0 ac.	0 ac.	0	H(90ac)
Webb	11.0 ac. H(? ac.)	1.4 ac.	0 ac.	9000 lin. ft.	H(275ac)
Holl	4.5 ac. H(? ac.)	1.4 ac.	4.1 ac.	0	H(100ac)
TOTAL	15.5 ac. +H(? ac.)	2.8 ac.	4.1 ac.	9000 lin. ft.	H(465ac)

NOTE:The symbol "H" represents impacts from historic (i.e. post-July 1987) maintenance activities that have reduced habitat acreages or have kept habitat values lower than they would be without the maintenance activities. These historic impacts will be the subject of a separate analysis we will be pursuing through a contract in the future; a separate mitigation plan must be developed to address historic impacts.

Scrub-shrub, Freshwater Marsh, and Riparian Forest habitat impacts can be effectively mitigated on Empire Tract or some alternate location near the three islands. Because the Shaded Riverine Aquatic habitat on Webb Tract provided a significant aquatic value at the land-water interface, we recommend those impacts be mitigated on-site adjacent to the levee on Webb Tract by construction of a low-water berm that will be planted with riparian species. In the absence of a full Habitat Evaluation Procedure (HEP), we are recommending the following replacement actions:

1. Scrub-shrub: In-kind and acre-for-acre replacement (15.5 acres), off-site

2. Freshwater Marsh: In-kind and acre-for-acre replacement (2.8 acres), off-site

3. Riparian Forest: In-kind and 2 acres replacement for every 1 acre of impact (Riparian Forest habitat will require several years to reach the habitat value of the lost habitat on Holland Tract.)
(4.1 acres x 2 = 8.2 acres), off-site

4. Shaded Riverine Aquatic: In-kind and equal linear replacement (9000 lineal feet), on-site

The DFG estimates that it will require a total of 26.5 acres of land on an alternative site to replace the Scrub-shrub, Riparian Forest, and Freshwater Marsh habitats. Replacement of the Shaded Riverine Aquatic habitat will require the development of 9000 lineal feet of near-shore low-water berm with vegetation at appropriate locations on the waterside shoreline of Webb Tract. The historic impacts of maintenance practises on Ruderal habitat (465 acres) and Scrub-shrub habitat (unknown acreage) will require the development of a separate impact assessment and mitigation plan based upon the impact assessment.

We look forward to working with you to develop the long-term mitigation plan for Bouldin Island, Holland Tract, and Webb Tract. In addition to the mitigation measures we have described above, the mitigation plan should include provisions for protection of State- and Federally- listed and Candidate fish, wildlife, and plant species that may be associated with or depend upon habitat provided by the levees. The mitigation plan should also include provisions for permanent protection of the mitigation area, monitoring of the mitigation area to assure the success of the mitigation measures, and permanent management of the mitigation area. We are preparing a model "Mitigation Agreement" which may be of use in developing the mitigation plan. We will send a copy of that document to you as soon as it is completed.

If you have any questions regarding this letter, please contact Mr. Jerry Mensch, Environmental Services Supervisor, Mr. Scott Clemons, Associate Wildlife Biologist, or Mr. Frank Gray, Associate Fishery Biologist, at (916) 355-7030.

James D. Messersmith
Regional Manager

cc: Ms. Mary Johannis
DWR Central District
3251 S Street
Sacramento, California 95816

Mr. Scott Morris
Murray, Burns, & Kienlen
1616 29th Street, Suite 300
Sacramento, California 95816

Mr. Tom Coe
Regulatory Section
U.S. Army Corps of Engineers
Sacramento District
650 Capitol Mall
Sacramento, California 95814 -4794

STATE OF CALIFORNIA—THE RESOURCES AGENCY PETE WILSON, *Governor*

DEPARTMENT OF FISH AND GAME
REGION 2
1701 NIMBUS ROAD, SUITE A
RANCHO CORDOVA, CALIFORNIA 95670

(916) 355-7020

February 11, 1992

Mr. John Winther
Delta Wetlands, Inc.
3697 Mt. Diablo Blvd., Suite 120
Lafayette, California 94549

Dear Mr. Winther:

The Department of Fish and Game has reviewed the proposal regarding mitigation for net long-term losses to wildlife habitat associated with levee repair and maintenance activities on the four islands you manage. These islands include Reclamation Districts No. 756 (Bouldin Island, San Joaquin County), No. 2025 (Holland Tract- Contra Costa County), No. 2026 (Webb Tract, Contra Costa County), and No. 2028 (Bacon Island, San Joaquin County). Your proposal involves paying the owner of Medford Island to dedicate approximately 49 acres of fallow agricultural land on the interior of Medford Island as wetland habitat.

Since July 1, 1987, SB 34 funded levee maintenance and improvement activities have resulted in losses of habitat at all four Districts. We assume that these levee maintenance and improvement activities will continue for the foreseeable future. We have reviewed the existing habitat information and estimated the total habitat losses from past and future levee maintenance and improvement activities on the four subject Districts will involve 45.7 acres of riparian and wildlife habitat: (scrub-shrub = 26.6 acres; riparian forest = 6.1 acres; freshwater marsh = 13.0 acres). This loss provides the basis for the creation of the 49 acre mitigation area. In addition to the above losses, 10,780 lineal feet (6.1 acres) of shaded riverine aquatic habitat will be replaced elsewhere under a separate mitigation plan and agreement.

The DFG endorses the concept of developing the subject 49-acre area on Medford Island into a mitigation area, and the timely implementation of a DFG-approved mitigation plan and mitigation agreement for this property. This would satisfy all of the mitigation requirements for the aforementioned reclamation districts with the exception of shaded riverine aquatic habitat losses. The mitigation area should produce riparian and scrub shrub habitat in addition to the existing potential for

freshwater marsh. Native trees should be planted, and there should be a permanent water supply to ensure long-term growth and survival of all plants.

We have been in contact with Mr. Earl Cooley, who provided us with a letter regarding a proposed mitigation bank area to be developed on Medford Island January 16, 1991 (attached). DFG personnel will make a site visit soon with Mr. Cooley to consider possible area designs. We agree that the timely implementation of mitigation is essential.

If you have any questions, please call Mr. Frank Gray or Mr. Scott Clemons, Environmental Specialists, of our Rancho Cordova office at (916) 355-7030.

Sincerely,

James Messersmith
Regional Manager

Attachment

cc: Earl Cooley
L & L Farms
No. 1 Medford Island
Stockton, CA 95219

Ms. Mary Johannis
Department of Water Resources
3251 S Street
Sacramento, CA 95816

Mr. Scott Morris
Murray, Burns, & Keinlen
1619 29th Street, Suite 300
Sacramento, CA 95816

Mr. Scott Clemons
Department of Fish and Game
Rancho Cordova, CA

Mr. Frank Gray
Department of Fish and Game
Rancho Cordova, CA

MURRAY, BURNS AND KIENLEN
A CORPORATION
CONSULTING CIVIL ENGINEERS
1616 29th STREET, SUITE 300
SACRAMENTO, CALIFORNIA 95816
TELEPHONE (916) 456-4400
FAX (916) 456-0253

JOSEPH D. COUNTRYMAN, P.E.
GILBERT COSIO, JR., P.E.
MARC E. VAN CAMP, P.E.

JOHN F. WRIGHT, P.E.
MICHAEL C. ARCHER, P.E.
SCOTT A. MORRIS, P.E.
MARK E. FORTNER, P.E.
JANELLE L. HEINZLER

ANGUS NORMAN MURRAY
1913 - 1985

CONSULTANTS:
JOSEPH I. BURNS, P.E.
DONALD E. KIENLEN, P.E.

FILE: RD 2025
COPY TO FILE: RD 2026

September 30, 1993

VIA FAX

Mr. Ryan Broddrick, Regional Manager
Department of Fish & Game,
Region 2
1701 Nimbus Road, Suite A
Rancho Cordova, California 95670

Dear Mr. Broddrick:

It has been brought to our attention that the agreement to establish a mitigation area on Medford Island has been signed. However, from discussions with Mr. Frank Gray of your office, it appears that it does not satisfy the original intent to cover worse case mitigation requirements for past and future levee work on Webb and Holland Tracts, and Bacon Island. Rather, the agreement, as approved, only covers past impacts. We've not received a copy of the agreement to verify for ourselves that the wording applies to past impacts only, but telephone conversations with Mr. Gray indicate that this is the case. We are currently contacting the respective reclamation districts to inform them of the problem. Their first reaction will, of course, be to rectify the mix-up, which we are hereby requesting of the Department of Fish and Game (DFG).

The concept of using Medford Island as the area to mitigate for the worst case scenario goes back well over three years. We had been informed by DFG that on-site mitigation would not be acceptable on islands planned for the Delta Wetlands Project. The subject reclamation districts were willing to mitigate up-front for the worst case scenario. That is, all habitat values existing on the levees in July 1987 would be developed in mitigation area(s) in the event unavoidable future impacts took place. In reality, the districts had agreed to a significant enhancement since total clearing was never planned, nor is it physically possible to remove all vegetation and keep it off the levees. The districts acknowledged that this concept did not cover impacts to shaded riverine aquatic habitat.

FILE

However, it was determined by DFG that this proposal was not acceptable since the mitigation sites would not stay, as originally developed, in perpetuity. The Delta Wetlands Project would move the mitigation to another site if that project ever became a reality. As a result, today we have no mitigation in place, and Webb Tract levee rehabilitation is being held up by a pending 404 permit.

DFG conceptually agreed to worst case mitigation off-site in August 1991 (see attached letter). Since the August 1991 letter, it was determined impacts to ruderal species would not result in a net long-term loss of habitat. Other possible mitigation areas failed to develop, leaving Medford Island as the only alternative. It was also determined that about 50 acres would be sufficient to mitigate for any possible past and future impacts. In fact, the size of the Medford Island mitigation area was predicated on accommodating this 50 acres. Since that time, the districts have been waiting patiently as DFG and Medford Island worked out an agreement.

To find out the final agreement does not allow for the worst case is truly a shock. Please review your files and discuss the situation with those involved with the original intent of the agreement. Your assistance in rectifying the problem is appreciated. We can set a meeting up if you would like to meet with me and district representatives to discuss the matter further.

If you have any questions or require additional information, call me at (916) 456-4400.

Sincerely,

MURRAY, BURNS and KIENLEN

By:
Gilbert Cosio, Jr.

GC:bl
Encl.
cc: Reclamation District No. 2025
c/o Mr. David Grilli
Reclamation District No. 2026
c/o Mr. David Forkel
Reclamation District No. 2028
c/o Mr. Al Warren Hoslett
Mr. Ed Littrell, DFG

FILE: RD 2026

FISH AND WILDLIFE HABITAT

MITIGATION AGREEMENT BY AND BETWEEN

RECLAMATION DISTRICT NO. 2041

AND

CALIFORNIA DEPARTMENT OF FISH AND GAME

This Mitigation Agreement ("Agreement") is made and entered into by and between Reclamation District No. 2041 (Medford Island), hereafter referred to as the "District", and the California Department of Fish and Game, hereafter referred to as the "Department".

The purpose of this Agreement is to guarantee adequate mitigation for the loss of 13 acres of freshwater marsh, 28 acres of scrub-shrub habitat, and 6 acres of riparian forest habitat that were growing on or adjacent to local non-project levees in the Sacramento-San Joaquin Delta. These habitat losses are long-term in nature, and occurred in conjunction with the rehabilitation and maintenance of the non-project levees that surround Medford Island, San Joaquin County (work performed by the District), Holland Tract, Contra Costa County (work performed by Reclamation District No. 2025), Webb Tract, Contra Costa County (work performed by Reclamation District No. 2026), and Bacon Island, San Joaquin County (work performed by Reclamation District No. 2028). Reclamation districts 2025, 2026 and 2028 asked the District to develop and manage the mitigation efforts on Medford Island on their behalf. The District accepted this responsibility. Reclamation districts 2025, 2026, and 2028 are thus beneficiaries of this Agreement because the habitat to be restored by the District shall satisfy part of their mitigation requirement under the provisions of the Delta Flood Protection Act of 1988. Said three reclamation districts shall have rights to enforce the provisions of this Agreement.

The levee rehabilitation and maintenance activities noted above shall hereafter be referred to as the Project. The Project was performed pursuant to the provisions of the Delta Flood Protection Act of 1988. The authority for this Agreement comes from Sections 1600, 1755 and 1801, et. al. of the Fish and Game Code, Sections 21001 and 21002 of the Public Resources Code, Sections 15040 (c) and 15041 of the California Environmental Quality Act (CEQA) Guidelines, and Section 12987 of the Water Code.

The specified mitigation measures and actions to be undertaken by the District and the Department pursuant to this

Agreement are attached hereto as Exhibit 1 (hereinafter the "Mitigation Plan").

WITNESSETH

WHEREAS, the four named reclamation districts requested the Department to approve their plans for levee rehabilitation and maintenance under the provisions of the Delta Flood Protection Act of 1988, and

WHEREAS, the Department, after reviewing the plans and conducting several site inspections determined that the nature of the Project made it impossible to avoid impacts on-site, and

WHEREAS, the Department believes that in-kind replacement of 13 acres of freshwater emergent marsh habitat, 28 acres of scrub-shrub habitat, and 6 acres of riparian forest habitat is feasible on lands currently owned by L & L Farms on Medford Island in San Joaquin County, and

WHEREAS, pursuant to Fish and Game Code Section 1802, the Department has jurisdiction over the conservation and protection of fish, wildlife and native plants and holds these resources in trust for the people of California, and

WHEREAS, pursuant to Water Code Section 12987, the Department must disapprove plans prepared under the provisions of the Delta Flood Protection Act of 1988 if those plans result in the unmitigated use of channel islands for levee repair materials, or if the plans result in a net long-term loss of fisheries, wildlife, or riparian habitat, and

WHEREAS, the Department desires permanent replacement of the specified scrub-shrub, freshwater marsh, and riparian forest habitat to assure that any net long-term losses of those habitats are adequately mitigated, and

WHEREAS, L&L Farms agrees to grant an easement as more particularly set forth in Exhibit 2, attached hereto (hereinafter the "Conservation Easement"), and

WHEREAS, the District, acting for itself and on behalf of the other three named reclamation districts, agrees to mitigate as specified in the Mitigation Plan for Project-induced losses of 13 acres of freshwater marsh habitat, 28 acres of scrub-shrub habitat, and 6 acres of riparian forest habitat.

NOW THEREFORE, the parties agree as follows:

A. DUTIES

1. The Department shall acquire a Conservation Easement over 73.59 acres of land (hereinafter referred to as "Habitat Areas") on Medford Island. This acquisition shall occur within 6 months of the execution of this Agreement.

2. The District acting in its own capacity, or through a designated agent approved by the Department, shall preserve, enhance, and maintain the Habitat Areas in good condition in perpetuity.

3. As mitigation for the habitat losses resulting from the Project, the District agrees to complete the initial habitat plantings and water structure development actions described in the Mitigation Plan within a reasonable time but no later than twelve (12) months from the execution of this Agreement. These actions shall take place within the Habitat Areas, within a 50 acre area hereinafter referred to as the "Mitigation Area". A portion of the remaining 23.59 acres of the Habitat Areas shall serve as a buffer zone to protect the Mitigation Area. L&L Farms may utilize the 23.59 acre buffer zone for purposes as described in the Mitigation Plan or Conservation Easement. The Department reserves the right to designate all or part of the 23.59 acres as mitigation for habitat losses which may result from the District's future levee maintenance and improvement activities which are eligible for funding under the Delta Flood Protection Act of 1988.

4. If the Mitigation Area is damaged or destroyed by catastrophic events beyond the control of the District (including but not limited to flood, fire, wildlife disease, and vandalism), the District shall notify the Department and the Department shall determine the appropriate course of action. If the Department determines the Mitigation Area must be restored, the District shall perform the restoration to the extent that funds are available from monies provided to the Department by the California Legislature in 1991 (Chapter 1140). If the levees surrounding Medford Island fail, and Medford Island is not reclaimed, the District shall have no further obligation for restoration or management of the Mitigation Area.

5. The Department and the District have entered into this Mitigation Agreement contemplating normal operating and maintenance expenses based on historical practices in the San Joaquin Delta region. In the event subsequent laws, rules, or regulations or other events occur which modify the historical procedures and significantly impact the cost or expense of operating and/or maintaining the Habitat Area, the Department and the District shall meet and mutually confer in an effort to

reasonably allocate the sharing of the additional cost or expense. In the event the parties are unable to agree with respect to such allocation the matter shall be referred to arbitration pursuant to the provisions of the California Code of Civil Procedure $1280, et seq.

B. COSTS

The parties to this Agreement have determined that the direct cost of acquiring the Conservation Easement and the direct cost of enhancing and managing the Mitigation Area will be as set forth below.

1. Acquiring a permanent Conservation Easement over the Habitat Area.
   Cost: $ 91987.50

2. Enhancement, operation and maintenance of the Mitigation Area during the development phase (three years) as described in the Mitigation Plan.
   Cost: $178,121

3. Perpetual operation and maintenance of the Mitigation Area and payment of levee assessments for the Habitat Areas following the development phase, as described in the Mitigation Plan.
   Cost: $179,699

C. FUND MANAGEMENT

Funding for the mitigation actions required by this Agreement shall be provided from the Department's account established for habitat mitigation under Chapter 1140, Statutes of 1991. The following describes how the funding will be managed for the development and operations and maintenance activities described in the Mitigation Plan and in this Agreement:

1. Development Phase Payment Terms

The Department shall pay the District to enhance, operate and maintain the Mitigation Area during the development phase, using funds identified in Section B.2.. Funds for development shall be disbursed to the District under the following terms:

a) Seventy-five percent (75%) of the total development cost ($133,590.75) will be paid to the District within 90 days from the execution of this Agreement.

described in this Agreement and in the Mitigation Plan. This report shall be sent to the Department's Region 2 Office, attention Regional Administrative Officer.

D. DEFAULT

Upon information and belief that the District has not complied with the conditions or obligations required of it in this Agreement or in the Mitigation Plan, the Department shall notify the District in writing that a default has occurred and give the reasons therefor. The District shall have 30 days following receipt of such notice within which to commence (and thereafter diligently pursue) corrective action to cure such a default. In the event the District fails to cure the default within 120 days following receipt of such notice, the Department shall have all rights and remedies available at law or equity including but not limited to specific performance and injunctive relief.

E. DEPARTMENT COVENANTS, REPRESENTATIONS AND WARRANTIES

The Department hereby covenants, warrants and represents as follows:

1. The Department, its designee, or successor shall hold a permanent easement deed to and protect all lands conveyed under this Agreement solely for the purposes of conservation, restoration and enhancement of those riparian and wildlife habitats and species adversely impacted by the Project. This covenant shall run with the land and no use of such land shall be permitted by the Department or any subsequent easement holder or assignee which is in conflict with the stated conservation purposes of this Agreement. If at any time in the future the Department, the District, the titleholder, or any subsequent transferee uses or threatens to use such lands for purposes not in conformance with the stated conservation purposes contained herein, the California Attorney General, or California residents shall have standing as interested beneficiaries to challenge such nonconforming uses of lands transferred herein; AND

2. The Department, its designee, or successor shall record on each deed a statement that the lands (or an easement over said lands) described in the deed of record have been conveyed to the Department or its agent for purposes of conservation, preservation, restoration and maintenance of those species and habitats adversely impacted by the Project. Such statement shall be substantially as provided in Exhibit 2.

b) Fifteen percent (15%) of the total development cost ($26,718.15) will be paid to the District upon the Department's determination that the District has satisfactorily completed the berm construction, water system development (including renovation of the existing irrigation and drainage system, and replacement of one siphon), and initial habitat plantings, as described in the Mitigation Plan.

c) Ten percent (10%) of the total development cost ($17,812.10) will be paid to the District upon determination by the Department that the District has met the performance standard specified in the Mitigation Plan (successful establishment of 13 acres of freshwater marsh, and survival of 1,600 trees and shrubs at the end of three years from the date of the initial plantings).

2) Long-term Operation and Maintenance

Within 90 days from the execution of this Agreement, the Department shall provide the District with $179,699. The District shall use this fund to create an operation and maintenance trust account which shall be dedicated to the perpetual operation and maintenance of the Mitigation Area and to the payment of specified annual levee assessment fees to the District for the Habitat Areas. The District shall begin to draw funds from this trust account after completion of the development phase. The District shall withdraw funds from the trust account on an as-needed basis; the total annual draw shall not exceed $7,188, except during years when replacement of the siphon(s) is necessary. A portion of the total annual draw shall be used by the District as the annual levee assessment fees for the Habitat Areas. Said annual levee assessment fees shall be paid at $25 per acre (total annual fee: $1,570), and such fees may be increased to a maximum of $34.84 per acre (total annual fee: $2,188) in the event of increased levee repair costs due to flood damage or levee failure.

3) Annual Accounting Report

By February 1 of each year the District shall prepare and present a report detailing expenditures from the funds provided for the mitigation actions

F. MISCELLANEOUS PROVISIONS

1. NOTICES

All notices and other communications required or permitted to be given or delivered pursuant to this Agreement shall be in writing and shall be delivered in person or by courier, by telecopy, or sent by first-class or certified mail, return receipt requested. All such notices or transmittals shall be deemed delivered upon the earlier of actual receipt or three days after posting by certified mail addressed to the recipient as follows:

DISTRICT
Mr. Tom Luckey
2495 West March Lane
Stockton, California 95207

DEPARTMENT (1) Regional Office Address:
California Department of Fish and Game
Region 2
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

(2) STATE HEADQUARTERS ADDRESS:
California Department of Fish and Game
Legal Affairs Division
1416 Ninth Street, 12th Floor
Sacramento, California 95814

2. ENTIRE AGREEMENT

This Agreement, along with the exhibits attached hereto, constitutes the entire Agreement and understanding between the Department and the District for the Project. This Agreement supersedes all prior and contemporaneous agreements, representations or understandings of the parties, if any, whether oral or written.

3. GOVERNING LAW

This Agreement shall be governed by the laws of the State of California. Actual or threatened breach of this Agreement may be prohibited or restrained by a court of competent jurisdiction.

4. BENEFIT OF AGREEMENT

This Agreement is for the benefit of the People of the State of California by and through the Department and its successors and assigns. This Agreement provides the mitigation for habitat loss as identified, and acceptable performance by the District shall satisfy the mitigation requirements specified for all four identified reclamation districts.

5. AMENDMENTS

This Agreement cannot be amended or modified in any way except by a written instrument duly executed by the District and the Department.

6. TERMINATION

This Agreement may be terminated under the following circumstances:

a. The Department notifies the District in writing that the Agreement is terminated. Termination shall become effective within 30 days following receipt of such notice.

b. The Department determines that a default has occurred, and the District does not correct the default within a reasonable time.

c. A catastrophic event beyond the control of the District occurs, damaging the Mitigation Area, and the Department determines that the Mitigation Area cannot be restored.

d. The levees surrounding Medford Island fail, the Mitigation Area is flooded, and Medford Island is not reclaimed.

e. By law or judicial action.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Mitigation Agreement to be in effect as of the date last signed below.

RECLAMATION DISTRICT NO. 2041

By: _____

Dated: 9-20, 1993

Tom Luckey, President
Reclamation District No. 2041

CALIFORNIA DEPARTMENT OF FISH & GAME

By: _____

Dated: 9/10/93, 1993

Boyd Gibbons, Director
California Department
of Fish and Game

Approved as to form:

By: _____

Dated: September 30, 1993

Craig Manson
General Counsel
California Department
of Fish and Game

Appendix E – Response to Comments

RECLAMATION DISTRICT NO. 2025
(HOLLAND TRACT)

343 East Main Street, Suite 815
Stockton, CA 95202
Office (209) 943-5551
Fax (209) 943-0251

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October 13, 2022

Andrea Lobato, P.E., Manager
Delta Levees Program – Special Projects
Department of Water Resources
Post Office Box 942836
Sacramento, CA 94236-0001

Subject: Response to Comments on Five-Year Plan
Project Funding Agreement HL-18-1.1-SP

Dear Ms. Lobato:

This is in response to your letter dated October 5, 2021 providing comments on the Draft Five-Year Plan (Plan) for Reclamation District No. 2025 Holland Tract. A response to each comment is included below, and the modified Plan providing additional information is attached to this letter.

DWR Comment: Page ii: A List of Abbreviations is not included. Please provide one.

Response: A list of abbreviations has been added to the plan.

DWR Comment: Page ii: No page numbers are included in Appendices. Please provide page numbers for the entire report, including the Appendices.

Response: Page numbers have been added to the Appendices.

DWR Comment: Page 5: The exact date of the levee failure in January 1980 is not provided. Neither was the condition of the levee at the time of this event. Please provide this information if it is available.

Response: This comment has been addressed in the plan.

DWR Comment: Page 6: The Plan identifies that 100% of the levees are at or above HMP standard. However, Page 19 and Appendix B (Pages 8 and 11 of the Centerline Profile) show 219 feet of levee below HMP standard. Please clarify and correct/remove any conflicting language.

Response: The accuracy of the LiDAR data is such that it cannot be conclusively determined that the sites are, in fact, below HMP.

DWR Comment: Page 6: The Plan states "There are no miles of levee meeting FEMA requirements." However, above this statement is noted 100% HMP (FEMA Standard) compliant. Please clarify and correct/remove any conflicting language.

Response: Clarification has been added to the plan distinguishing the difference between FEMA's HMP criteria and an accredited levee under the National Flood Insurance Program (NFIP).

DWR Comment: Appendix B (Centerline Profiles), The Plan clearly shows several sections at the HMP and Bulletin 192-82 standard when the LiDAR survey taken in 2017-2018. Please provide an estimate when levee sections will fall below these standards based on an estimated subsidence rate.

Response: An approximate subsidence rate of 0.5"-1.0" per year could be assumed, but actual subsidence is not uniform and depends on many factors. Levee sections that minimally meet a standard have the potential to subside and not meet the standard by the following year. A levee section that is 1.0' above the standard could continue to meet the standard for an extended period of time.

DWR Comment: Please include your levee surveillance and settlement instrumentation program in your plan.

Response: This comment has been addressed in the plan.

DWR Comment: Appendix B (Quantity Estimate): Appendix B includes onsite and import fill in the Quantity Estimate. However, Appendix C (Draft Cost Estimate Cash Flow) only uses onsite fill to estimate the Five-Year Plan Cost Estimate. Please clarify and correct/remove any conflicting language.

Response: Appendix B has been revised.

DWR Comment: Appendix B (Quantity Estimate) and Appendix C (Draft Cost Estimate Cash Flow): Riprap and concrete asphalt are not included in the estimates. Please include these materials in the estimates.

Response: Appendix C has been revised. All project line items, including riprap and concrete asphalt, are accounted in the cost estimate in Appendix C. Fill and AB are only shown as a reference.

DWR Comment: Appendix B (Quantity Estimate): Aggregate base is not included in the computation. Please include this material.

Response: The aggregate base estimate is shown in Appendix C.

DWR Comment: Appendix C (Draft Cost Estimate Cash Flow): An estimated planning cost for the different projects was not broken out in the Five-Year Plan Cost Estimate. Please provide an estimate these individual costs.

Response: This cost is included in the engineering cost, which is 20% of the estimated construction cost (see footnote 3 of Appendix C).

DWR Comment: Appendix C (Draft Cost Estimate Cash Flow): Appendix C estimates 32,600 cubic feet of onsite fill is needed for the levee rehabilitation project. However, Appendix B (Quantity Estimate) computed a different quantity for the onsite fill. Please clarify and remove the conflicting language.

Response: Appendix B has been revised to state that the adjusted onsite fill quantity required does not account for a 5,000 CY allocation for haul roads.

DWR Comment: Page 15: "At this time, the District has no other cost sharing partners to provide funding for rehabilitation and maintenance." Please identify all potential cost share partner who can contribute to the goal of the Five-Year Plan.

Response: There is a possibility of developing a partnership with a coalition of urban water agencies that have a common interest in levees in the future. The plan has been updated to reflect this possibility.

DWR Comment: Page 16-17 Needed Improvements to Reduce Existing Hazards: Please identify the public benefits to recreation, navigation, fish, and wildlife.

Response: The plan has been updated to address public benefits to recreation, navigation, fish, and wildlife.

DWR Comment: Page 18: “If flooding occurred as a result of a high water event, the repair costs would be expected to reach $6,432,000 out of an estimated value of assets at $15,788,000 in 2007 dollars (ORMS, 2007)." Please provide an estimate what the repair cost would be in 2021 dollars.

Response: This comment has been addressed in the plan.

DWR Comment: Page 20: "There have been multiple reports and studies that have shown how these islands are critical to the water quality and water supply reliability for the State Water Project and Central Valley Project." Please identify and describe the opportunities and significant constraints for improving water quality and water supply.

Response: The plan has been updated to address the constraints and limited opportunities for improving water quality and supply.

DWR Comment: Page 22: "The District has proposed ecosystem enhancements where feasible, including seeding the landside slopes with native grasses." The Plan has only identified this has as an enhancement. Please consider that future PSPs will likely focus

on multi-benefit projects. Projects that include program habitat types of freshwater marsh, riparian forest, scrub-shrub forest, and especially SRA or waterside habitat are likely to score higher when evaluated.

Response: Comment noted.

DWR Comment: Page 23: "It is anticipated that the environmental documentation required will generally consist of a CEQA Mitigated Negative Declaration for the bulk of the work associated with this plan." Upon construction of the proposed projects, a Routine Maintenance Agreement will comply with CEQA's Categorical Exemption requirements and the no net loss of habitat requirement of the Delta Levees Program. Please update this Section based on the following:

- When a project may impact an environmental resource, the determination must be made without reference or reliance upon mitigation measures.
- Mitigation measures involve an evaluative process weighted against potential environmental impacts through standard CEQA procedures for an EIR or negative declaration.
- Projects filing as Categorical Exemptions will need to provide justification, as part of the draft SOW, that there are no exceptions to the exemption they intend to work under (Article 19 Categorical Exemptions: Section 15300.2 Exceptions).
- Projects filing as an IS/MND will need to provide the Initial Study for review as part of the draft SOW and before filing the MND can be filed.

Response: This comment has been addressed in the plan.

DWR Comment: The Plan does not mention miles of non-attributed levees.

Response: This comment has been addressed in the plan.

DWR Comment: The number of levee rehabilitation projects funded through Delta Levees Program was not identified.

Response: This comment has been addressed in the plan.

DWR Comment: The Total State funds expended for levee rehabilitation projects on the Local Agency's Tract through the Delta Levees Program was not identified.

Response: This comment has been addressed in the plan.

We look forward to the approval of the Plan. If you have any questions or require additional information, please contact Nathan Hershey with MBK Engineers at (916) 456-4400.

Respectfully submitted,
RECLAMATION DISTRICT NO. 2025

David A Forkel, Chairman

cc: MBK Engineers
c/o Mr. Nathan Hershey
Mr. Todd Gardner, Department of Fish and Wildlife

BJ/
4275-18 ANDREA LOBATO 2022-10-13