# ADAPTIVE MANAGEMENT PLAN

# FOR

# WATERBURY FILING NO. 1

# GEICK RANCH BASIN CHANNEL (EAST CHANNEL)

# HAEGLER RANCH TRIBUTARY 2 CHANNEL (WEST CHANNEL)

# EL PASO COUNTY, COLORADO

**PCD FILE NO:**

**SF237**

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**PROJECT BACKGROUND**

Waterbury Filing No. 1 is an analysis of approximately 61.87 acres to be developed within a larger 322-acre master planned PUD Development site. The Waterbury Filing No. 1 site consists of 198 proposed single-family homes. The site is located in a portion of Sections 28, 29 and 33, Township 12 South, Range 64 West of the Sixth Principal Meridian, El Paso County, Colorado. The site is bounded on the north by unplatted property (future phases of the overall Waterbury property), to the east by unplatted property (Vorhes Ranch property), to the south by the recently constructed Stapleton Road and on the west by existing platted 2.5-acre residential lots (4-Way Ranch Filing No. 1) and Eastonville Road. The site also sits between 2 existing drainage channels paralleling it on the east and west.

The East channel is in the Geick Ranch Basin and has been determined to be a jurisdictional water of the U.S. with associated jurisdictional wetland habitat. Therefore, to comply with Section 404 of the Clean Water Act, it must meet the 404(b)(1) project review criteria, which include impact avoidance and minimization. The development plan taken is to minimize Project-wide impacts to 0.5-acre or less such that the pre-approved Nationwide Permits (NWP) may be used. No channel grading or redesign is proposed for the channels; with the exception of the Sunken Meadow Crossing where 3-36" culverts are being placed and additional flow is routed into the channel further upstream. The rest of the channel is to remain natural at this time

The West Channel is the Haegler Ranch Tributary 2 and is located within a designated Zone A F.E.M.A. floodplain, as determined by Flood Insurance Rate Map No. 08041C0552 G dated December 7, 2018 (see appendix). No proposed lots are within the Floodplain as the channel is located within Tracts B & D. On March 19, 2004 a Letter of Map Revision (LOMR) was obtained to refine the floodplain in this unstudied area. In the beginning of 2025 areas where channel improvements are proposed or roadway crossings affect the floodplain, a "No-Rise" Certification was submitted to the El Paso County Floodplain Administrator since there is no rise of 0.50' or more along the Haelger Ranch Tributary 2 adjacent to our site. A Floodplain Permit was issued on March 14, 2025 by the EL Paso County Floodplain Administrator.

Both channels have a very substantial amount of vegetative cover containing cattails and Palustrine Emergent wetland vegetation and are currently stable with no signs of erosion except in the West Channel where there is an erosive spot with a drop that is starting to cut.

The 2 Channels will be monitored and maintained by the Waterbury Metropolitan District No. 1 (District).

**PROBLEM STATEMENT**

Healthy, productive and resilient drainage channels are a priority for the Waterbury Filing No. 1 subdivision as well as El Paso County.

HEC-RAS analysis shows concerns with 3 sections along the East Channel that show supercritical flow, erosive velocities or high Froude numbers. At this time no improvements are shown for these 3 sections as the established wetland vegetation shows no erosion or deterioration and the channel appear to be operating with no concerns. The West Channe HEC-RAS analysis shows 8

sections with concerns of supercritical flow, erosive velocities or high Froude numbers. Construction plans titled "*Waterbury Filing No. 1 Construction Set*" are in the process of being approved by El Paso County for drop structures and channel bank armoring. To avoid destroying all the established vegetation and keep the 2 channels as natural as possible we want to react to the channel metamorphize and deterioration where needed. It has been discussed with El Paso County to do an Adaptive Management Plan outside the required Operations and Maintenance Manual for the channels that addresses monitoring the channel and acting swiftly to address any future problems that may occur.

Although this adaptive management plan (Plan) is a required condition of Waterbury Filing No. 1 Final Plat and Final Construction Drawings project # SF237 and outlines strategies to pursue if post-construction goals and objectives are not met over time, everyone is aware that potential issues could arise post-construction (i.e., vegetation not taking properly, sediment accumulation, erosion and other unforeseen issues) and is interested in monitoring the channels post construction to assess the possible negative effects on the channels.

This management plan is intended to go into effect once construction is complete and all designs elements have been achieved (i.e., drop structures, channel armoring, and re-vegetation are achieved).

**ADAPTIVE MANAGEMENT PLAN GOALS**

This Goals of this management plan is for the Waterbury Metropolitan District No. 1 to monitor and react to any potential problems and recognize that construction flaws or environmental conditions, such as the natural metamorphize of channels, a greater than a 100-Y storm event or multiple large storm events in short time period, or just constant runoff over time could result in channel failures that may need to be addressed, such as erosion, undercutting of drop structures or rip-rap armoring. Those failures need to be addressed immediately and in addition to the monitoring tasks presented here the approved Operations and Maintenance Manual on file For Waterbury Filing No. 1 shall also be referenced and used in conjunction with this Adaptive Management Plan by the District.

Collectively, this AMP will drive the implementation of mitigation, and the data collection and review process to ensure impacts have been addressed. Monitoring results will be compared in the future to verify whether the impacts of the Project have been offset by mitigation actions. It should be noted that many of these details are currently being refined, and will be finalized prior to construction. In addition, this AMP will remain flexible to adapt to the needs of the Project over time. As such, this document is open to change throughout the life of the Project.

**ADAPTIVE MANAGEMENT PLAN OBJECTIVES, DESIGN, & FRAMEWORK**

The purpose of this Adaptive Management and Mitigation Plan (AMP) is to provide a framework for implementing this adaptive approach.

**Objective 1: Provide an overview of the adaptive process, including the collaboration process with Owners, District, Owners Engineers and Wetland Specialists, Local, State and Federal natural resource agencies and a monetary agreement for performing all monitoring, analysis, design and implementation**

Adaptive management (AM) is a "learning by doing" management approach which promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood (National Academy of Sciences 2004). It is used to address the uncertainties often associated with complex, large-scale projects. In AM, a structured process is used so that the "learning by doing" is not simply a "trial and error" process (Walters, 1986). The basic elements of an AM process are: (1) Assess; (2) Monitor; (3) Evaluate; (4) Implement; (5); Adjust. In practice, AM is implemented in a non-linear sequence, in an iterative way, starting at various points in the process and repeating steps based on improved knowledge.

An Adaptive Management Team (AMT) will provide essential support to the Project in meeting its goals and objectives through the application of a systemic approach to evaluating Project impacts and mitigation effectiveness through monitoring activities. The AMT consists of a multiagency staff from the appropriate disciplines, including engineering, planning, environmental science and resource management. The non-Federal sponsors will participate directly on the AMT and serve as the AMT leader. The members of the AMT will include:

- Waterbury Metropolitan District No. 1
- District Engineer
- Wetland Expert
- EL Paso County Engineering Department
- EL Paso County Floodplain Engineering Department
- 4-Way Ranch Metropolitan District

The Adaptive Management Team (AMT) will work together to come up with a procedure for collecting and providing monetary funds to perform the monitoring, collected data analysis, design, and implementation.

**Objective 2: Provide a functional assessment of impacts and mitigation needs for channel stability and wetland resources.**

Inspect channel to ensure continued function as initially intended. Check for erosion, slumping, excessive sedimentation, overgrowth, embankment and inflow integrity, and damage to any structural or riprap elements. Report any illicit discharge immediately.

Assess lost habitat and mitigation need and how conditions could change over time. Changes in the amount of habitat (and habitat units) could occur as habitat changes and are influenced over time by river and watershed conditions. Improved watershed conditions could improve stream health in the future; thus, habitat loss could be greater over time. Conversely, continued degradation could further reduce the amount of habitat that is lost through these footprint impacts. Mitigation value could also change over time. Given the uncertainty with whether habitat conditions might generally improve or degrade in the future, or to what magnitude such changes would occur, it was assumed that conditions would remain constant over time when assessing impacts. It is recognized that habitat conditions likely will not remain constant. For assessing mitigation benefits, consideration was given as to how long it may take habitat restoration projects to reach full effect. The above approach was used to estimate habitat quality and mitigation needs for wetlands resources. Mitigation would target no net loss of wetland impacts.

**Objective 3: Provide an overview of project mitigation. The AMT will continue to coordinate with local agencies to refine mitigation plans.**

Any proposed mitigation for the channel for the channel Geomorphology will be based upon current EL Paso County criteria, specifications and standards. Wetland mitigation shall follow local, State and Federal regulations.

**Objective 4: Outline specific monitoring activities that will be done pre- and post-construction, including cost estimates for these activities.**

The purpose of this section is to lay out the plan for pre- and post-construction monitoring. Monitoring will be done in concert with the overall adaptive management approach outlined above.

The purpose of monitoring is to better characterize pre-project conditions for key resources, characterize these resources following Project implementation, verify resulting Project impacts, and verify whether mitigation is offsetting these Project impacts. An overview of methodologies is provided, along with a summary of costs. Pre-construction monitoring efforts will be led by the District Engineer and Wetland Expert.

Following construction, monitoring and adaptive management would be the responsibility of the District Engineer and Wetland Expert as a requirement of Project Operation and Maintenance. All monitoring will be done collaboratively with the AMT.

The monitoring approaches outlined below will need to remain flexible to adapt to the needs of the Project. As such, this AMP, including the monitoring strategies is open to change. Modifications to the monitoring approach could be needed due to altered conditions either pre- or post-project; alternative technologies or techniques that become available for monitoring; and refinement of specific Project features or mitigation actions.

Monitoring activities will be focused on key resources of concern. These include:

- Channel Erosion or degradation
- Floodplain concerns
- Wetlands
- Geomorphic and Water Quality
- Loss of Vegetation
- Channel Structural elements
- Riprap armoring
- Culvert crossings

**Photo Documentation and Visual Inspection**

To track the general project trend and changes over time, visual inspections, including photo points, will be an annual part of the monitoring plan. The following protocol will be used annually for photo documentation:

1. The site will be photographed at the start and end of the reach, and at each monumented cross-section each year during a period of lowest flow.

2. Standing on the left bank at each monumented cross-section, take a photo looking upstream, looking downstream, and across the cross-section.

3. Establish several photo points at high points along the ridge and mark them with rebar and flagging and save a GPS point of the location. Take at least one photo looking up valley and one photo looking down valley from each of these locations.

4. Anecdotal observations of fish and wildlife presence, habitat feature utilization, and other qualitative assessments of site condition will be recorded and included within the monitoring report as relevant.

**Objective 5: Outline performance standards/metrics that will be used to measure the success of mitigation. It also overviews a contingency process where corrective actions could be pursued should impacts prove greater than anticipated; and/or if mitigation proves to be less effective at offsetting impacts.**

**Channel Compensatory Mitigation Performance Standards**

1. Large quantities of sediment in the channel and reduced conveyance rate/capacity
2. Severe erosion including gullies, excessive soil displacement, unusual areas of settlement, holes
3. Deterioration and/or damage to structural components – broken concrete, damaged pipe, drop/check structures or dissipators
4. Overall channel failure

**Shallow Marsh Wetland Compensatory Mitigation Performance Standards**

1. Control of invasive and/or non-native plant species shall be carried out for five full growing seasons. Control shall consist of mowing, burning, disking, mulching, biocontrol and/or herbicide treatments. By the third growing season, any areas one-quarter acre in size or larger that have greater than 50 percent areal cover of invasive and/or non-native species shall be treated (e.g., herbicide) and/or cleared (e.g., disked) and then reseeded. Follow-up control of invasive and/or non-native species shall be implemented as stated above.

2. Hydrology shall consist of a water table < 6 inches below the soil surface, to inundation up to 6 inches in depth, for a minimum of 56 consecutive days, or two periods of 28 or more consecutive days, or four periods of 14 or more consecutive days, during growing seasons under normal to wetter than normal hydrological conditions (the 70 percent of years based on the most recent 30-year record of precipitation). During the growing season, inundation up to 18 inches in depth is permissible during wetter than normal years or in response to precipitation events provided that the duration does not exceed 28 consecutive days (i.e., water depth drops from 18 inches to 6 inches within 28 days).

## ANALYSIS AND EVALUATION PLAN

The data collected from the site inspections shall be done by a qualified District representative and the Districts appointed Engineer and Wetlands expert. This collected data should then be used to determine if there are any problems or items that need attention and further analysis and inspection of said problem.

### Data Storage and Analysis

### Data Storage:

Monitoring data will be stored and maintained by a member of the AMT in their central data management system. Data will be made available to the project review team within 30 days of such a request. Data tables will be normalized to avoid redundant data structures and to ensure consistent data formats among sampling events.

### Data Analysis and Reporting:

Photo documentation and visual inspection, along with vegetation survey data, will be analyzed annually; however, a monitoring report will not be required. Following a bankfull or 5-year event, a monitoring report will be generated to summarize the findings of a complete monitoring survey. The Project Sponsor will prepare a monitoring report that includes:

- Summary of metrics for which data were collected;
- Deviations from established methods and protocols used to collect data;
- Narrative discussions to explain results in the context of project goals, success criteria, and performance standards; and
- Any recommended actions.

## COMMUNICATION PLAN

After sharing the collected data from the inspections, the District, Engineer and Wetlands expert should summarize this data and contact the AMT to further analyze the collected data. These reports will be submitted to the project review team for review and comment on or before March 30 of each year. If significant issues or concerns are identified, the Project Lead will convene the project review team to discuss any comments, recommendation, and future actions at the sites. The next step is to coordinate with El Paso County Engineering Department on whether there are any concerns or actions needed for improvements or maintenance.

## ADAPTIVE MANAGEMENT ACTIONS

Potential Responses Once construction is completed, the AMT will regularly check to ensure design standards are met over time. The biggest concern would likely be the erosion of channel bottoms or banks, undercutting of newly installed drop structures or riprap lining, and destruction or reduced cover of vegetation. If such failures occur, the team will evaluate the potential harm to the environment and project success, and act to reverse such harm within the means, methods and resources available.

The first round of data collected post-construction will be the baseline from which metrics will be compared to determine if expected results are met (in addition to the baseline collected pre-construction). During the first few years, material will settle and vegetation will vary depending on soil conditions.

As data is collected to support understanding and analyses of the objectives addressed in this document, regularly re-evaluation of the success of the improvements. This evaluation would occur at minimum twice each year once in the spring (wet season) and once in the fall (dry season) but also after any rainfall event above a 5-year storm. If expected results are not met or outcomes appear to be detrimental, AMT will determine potential responses.

Below, we list potential responses that would be evaluated in this process. It should be noted that not all triggers will require immediate action and may just require further analysis and study over time to understand the level of detriment occurring.

### Objective 1 Actions: Overview of the adaptive process

The effectiveness of adaptive management hinges upon an effective monitoring program to establish objectives, thresholds, and baseline conditions. This will be achieved through a stepwise process that includes both pre-construction and post-construction studies of biota and physical habitat. These studies are scheduled for both impact and mitigation sites, allowing impacts to be verified, and for mitigation effectiveness to be evaluated.

Monitoring programs are a key component of AM. Monitoring provides feedback between decision making and system response relative to management goals and objectives. An essential element of AM is the development and execution of a scientifically rigorous monitoring and assessment program to analyze and understand system response to Project implementation. It is recognized that Project level monitoring would be limited by cost and duration based on current regulations and that Project level AM plans would need to be designed to reflect this constraint. However,

post-project monitoring would be a part of Project implementation, with monitoring required from the non-federal sponsors as a part of Project operation and maintenance.

Following the adaptive framework of this document, impacts would be monitored over time and performance of measures would be assessed to determine whether additional avoidance, minimization, or mitigation measures are needed. Future monitoring will provide information on the accuracy of the conclusions reached on the extent of impacts from the Project features and evaluate the effectiveness of mitigation. Monitoring activities, including review of results, will be performed collaboratively with the AMT.

Pre- and post-project monitoring is discussed in greater detail below in Section 4. Specific proposed sampling methodologies are being designed to address the performance standards/metrics outlined in Section 5.

**Objective 2 Actions: Functional assessment of impacts and mitigation needs for channel stability and wetland resources.**

**Geomorphology**

Potential effects to waterways, bank stability, erosion and sedimentation within and outside the existing channel and floodplain will need to be assessed for significant adverse impacts that may occur. Multiple design features were incorporated in the construction drawings to reduce the frequency the Project would need mitigation in the future. This was done specifically to minimize potential adverse effects to multiple resource types, including bank stability, erosion and sedimentation. With these pre-emptive construction design measures, adverse effects are anticipated, is anticipated to be minimal but may need more significant improvements or fixes. However, geomorphic conditions will be monitored as a part of the AMP (outlined below).

**Wetlands**

The East drainage channel is a jurisdictional water of the U.S. with associated jurisdictional wetland habitat. Therefore, to comply with Section 404 of the Clean Water Act, we must meet the 404(b)(1) project review criteria, which include impact avoidance and minimization. The option the client plan to take is to minimize Project-wide impacts to 0.5-acre or less such that the pre-approved Nationwide Permits (NWP). No channel grading or redesign is proposed for the channels; with the exception of the Sunken Meadow Crossing where 3-36” culverts are being placed and additional flow is routed into the channel further upstream (Design Point E-E on the PDR Map). The rest of the channel is to remain natural at this time as discussed below in the East Channel section.

A USACE Section 404 Permit Preconstruction Notification was submitted to the Army Corp of Engineers in February of 2022 and the USACE Verification Letter was returned in July of 2022 determining “that activities associated with the project are authorized by 2021 NWP 29 – Residential Developments.”

**Objective 3 Actions: Project mitigation**

**Geomorphology**

To qualify for stream mitigation, the project plan shall be designed to achieve the maximum level of improvement and should result in the restoration of the channel to its most probable natural state, given the individual constraints of the project location. This acknowledges that the maximum level of improvement may be constrained by water withdrawals, altered precipitation-runoff relationships, adjacent land use and other factors. lt is not necessarily the goal of stream mitigation to return stream segments to some pre-impact condition. While site-specific constraints may reduce the potential of mitigation sites (and correspondingly increase the mitigation ratios), mitigation goals should be to establish the maximum biological, chemical and physical integrity possible in the current environment.

Stream banks and channel bottoms shall be stabilized based upon recommendations of the AMT design engineer with input from the rest of the AMT.

**Wetlands**

As mentioned above there is no loss of Wetlands on the East Channel with the current design. Any possible future Mitigation would target no net loss of wetland impacts. If that is not feasible wetland replacement will need to occur. The AMT Wetland Expert shall review the concerns with the wetlands and coordinate to mitigate any wetland problems and possible wetland disturbance needed for planned improvements to the channel.

Any imporvements must be authorized and will not proceed until final mitigation plans have been reviewed and approved by the AMT and EL Paso County

**Objective 4 Actions: Monitoring activities**

**Geomorphology Assessment – Monitoring** - Includes: Pre- and post-construction geomorphic surveys, including a survey prior to, and a surveys following construction. This is in addition to the previously collected pre-design data set. Another pre-project

sampling event may occur during construction if a large event occurs Additional surveys may occur if deemed necessary through the adaptive management process.

• Final control structure designs will account for energy dissipation. Once design is finalized, shear stresses and velocities flowing out of the control structures will be verified to be lower than the threshold values for existing soil types.

• Adaptive management approach: Following Project operation, if bank failures or increasing bank instability is observed.

• Hydrology and Hydraulic Monitoring: Review of new development and revised flows upstream from the new development.

• Communication with Local Agencies: Annual or more frequent communication will occur with representatives from local agencies regarding channel morphology.

• Field Reconnaissance: A reconnaissance of the detailed study reaches and the diversion channel will be conducted upon completion of the Project (to establish baseline as a conditions) and every five years thereafter for the first ten years. If no significant changes are noted, reduce to every ten years. Prior to every ten-year interval, the GMT will meet to determine whether the reconnaissance is needed, based on the occurrence of floods in the previous 10 years. If no flooding has occurred, it is possible the reconnaissance won't be needed.

**Wetland Habitats – Monitoring:**

Wetland monitoring will include a wetland delineation of the site applying the Corps of Engineers Wetlands Delineation Manual, Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (current version). Please reference that manual for specific methodology. This delineation will be prepared by a wetland professional. Annual mitigation monitoring will be performed for five years after completion of a given mitigation site. Annual mitigation reports will be submitted to the AMT on the status of the mitigation. The reports will be submitted by December 31 following each of the first five growing seasons. The reports will, at a minimum, include the following information:

1. All plant species along with their percent cover, identified by meandering through each vegetative community, including upland buffers, and list commonly encountered – or dominant and co-dominant species observed. In addition, the presence, location and 35 percent cover of invasive, noxious and/or non-native species in any of plant communities will be noted. 2

2. Vegetation cover maps at an appropriate scale will be submitted for each reported growing season.
3. Photographs showing all representative areas of the mitigation site taken at least once each reported growing season during the period of July 1 to September 30. Photographs will be taken from a height of approximately five to six feet from at least one location per acre. Photos will be taken from the same reference point and direction of view each reporting year. Location of the photographs should be mapped on a GPS unit
4. Surface water and groundwater elevations in representative areas (e.g., at least one sample point in each plant community) recorded at least once each week for the first 10 weeks of each growing season, thereafter taken monthly for the remainder of each growing season. The location of each monitoring site will be shown on a plan view of the site.
5. If non-compliance activities are occurring on the site, the activity will be noted, photographed and mapped on a GPS unit. Best professional judgment would be used to determine if the activity is not compliance with easement or mitigation site plan.

**Objective 5 Actions: Performance standards/metrics**

1. Remove and dispose of sediment. Repair vegetation as necessary
2. Repair erosion – find cause of problem and address to avoid future erosion
3. Structural repair to restore portions of the channel to its original design
4. Contact EPC Engineering to coordinate proposed improvements.