

MEMORANDUM

Date:	January 12, 2025	01-12-2025
To:	The Black Pine Group	
From:	Cameron Jenkins PE, CFM	
Project:	Weber River Investigation	
Subject:	FEMA Review and Setback Discussion Memorandum	
Project #:	780-25-01	

Introduction and Background

Bowen Collins & Associates (BC&A) was retained by the Black Pine Group to review the FEMA flood hazards and setback requirements on their property located at approximately 5250 West and 1150 South (project area) in Weber County, Utah (see Figure 1). It is our understanding that the Black Pine Group is looking at developing over 500 acres of their property on multiple parcels near the Weber River. Most of the property is located in a 0.2 percent annual chance (500-yr) FEMA Special Flood Hazard Area (SFHA). The review of the flood hazards included obtaining and reviewing relevant data from different stake holders, providing guidance on how to be removed from the SFHA, reviewing the setback requirements, and providing recommendations when building inside of the setback. This memorandum documents the findings from completing these tasks.

FEMA Special Flood Hazard Area Review

The current effective Special Flood Hazard Area (SFHA), as depicted in Figure 2, became effective in 2023, superseding the previous 2005 mapping. (2005 mapping) The 2005 mapping was based on one-dimensional (1D) hydraulic models developed by the U.S. Army Corps of Engineers (USACE) in the 1970s, which had undergone several revisions over the years.

The 2023 study updated the terrain and discharges for the 1-percent annual chance (100-year) flood events throughout the project area, which now range between approximately 5,000 cubic feet per second (cfs) and 6,000 cfs, which are lower than the 2005 mapping discharge estimates. The current SFHA mapping designates the Weber River in the project area as Zone AE, with no designated floodway. It shows that the 100-yr floodplain is confined to the Weber River channel and its oxbows. The 500-year discharge is not contained in the channel and the 500-year floodplain encompasses most of the project area but is subject to less stringent development requirements.

FEMA Floodplain Requirements

Any proposed development within the FEMA-designated floodplain requires obtaining a floodplain development permit from Weber County and coordinating with the Floodplain Administrator. In the project area, the 100-yr floodplain is confined to the river channel as described previously except in an old oxbow. Critical facilities, including hospitals, schools, and fire stations, must be designed to

ensure protection from the 500-yr floodplain. This can include placing the structure on fill so it is above the 500-yr water surface elevation or using other flood-proofing methods.

The proposed development will not be in the 100-yr SFHA except for an old oxbow. Therefore, a LOMR is not required from FEMA unless the oxbow would be filled in.

Federal Flood Risk Management Standard (FFRMS) Requirements

This year, the U.S. Department of Housing and Urban Development (HUD) has implemented a final rule to enforce the Federal Flood Risk Management Standard (FFRMS), as outlined by Executive Order 13690. This rule, which may impact this development, strengthens floodplain management regulations to enhance community resilience to flooding and protect federal investments. This requirement became effective January 1st, 2025 for new construction.

Key Aspects of the FFRMS Requirements:

- **Expanded Floodplain Definition:**
The rule introduces the "FFRMS Floodplain," which expands the definition of flood-prone areas both vertically and horizontally. This adjustment considers future climate conditions to better identify and manage at-risk areas.
- **Elevation and Floodproofing Standards:**
HUD-assisted new construction and substantial improvements within the FFRMS floodplain must meet elevated elevation and floodproofing standards. These structures are required to account for anticipated future flood risks, minimizing damage and improving safety.
- **Minimum Property Standards Update:**
For housing covered under the FHA mortgage insurance program, the rule mandates that newly constructed structures within the 1-percent annual chance floodplain have their lowest floor at least two feet above the base flood elevation.

HUD estimates that 10% of new FHA single-family homes are located within the 1-percent annual chance floodplain and must comply with the Federal Flood Risk Management Standard (FFRMS). Additional information about FFRMS can be found at: [HUD FFRMS Information](#). The FFRMS framework is designed to ensure that construction projects are resilient to both current and future flood risks, supporting long-term sustainability and risk reduction goals.

For this project, since the 100-yr floodplain is confined to the river channel, the FFRMS requirements may not apply to residential development outside the Special Flood Hazard Area (SFHA). However, it is important to note that some mortgage companies might still consider this requirement because the development area falls within the 0.2-percent annual chance floodplain. This consideration underscores the importance of adhering to flood risk management standards to ensure project resilience and alignment with federal guidelines.

Setback Investigation

Setback requirements along rivers are critical regulatory tools designed to minimize risks associated with flooding, erosion, and ecological degradation. By maintaining a defined buffer zone between rivers and development, these requirements help protect public safety, property, and environmental quality. This section provides an overview of current setback requirements for Weber County and other counties for major rivers and how setbacks can be determined, explores options for development within setback limits, and provides recommendations for development for this project within the setback limits.

Weber County Setback Requirements

As of 2023, Weber County has established a 300-foot setback limit along the Weber River, as shown in Figure 3. This updated requirement increased from the previous 100-foot. The 300-foot buffer aims to mitigate flood risks by allowing for natural meandering and accommodating high-flow events, reduce erosion hazards by protecting structures and developments from unstable riverbanks, and preserve riparian habitats by supporting biodiversity and maintaining water quality. As part of a 2012 study for the County BC&A looked at how the Weber River has changed over the years and a figure of the changes is included in the Appendix.

However, the move from the 100-foot to a 300-foot setback has many impacts and challenges for development within the County. This change restricts structures and permanent developments are generally prohibited within the 300-foot setback, which may cause issues in areas with limited developable land and pushback from developers. As shown in Figure 3, the 300-foot setback has a significant impact on the project area. However, based on discussions with the Black Pine Group, they feel they can meet the intentions of a setback with 100-ft.

Currently, any proposed activity within the 300-foot setback zone would require conditional approval and potentially require detailed assessments, such as hydraulic/hydrological studies or mitigation plans, and will be subject to rigorous review by county officials. Note that even with setbacks, all developments within the regulatory floodplain, regardless of the setback, require permits to comply with county floodplain management ordinances.

Setback Standards along the Jordan River

The Jordan River, a critical waterway traversing both Salt Lake County and Utah County, has specific setback requirements designed to protect its environmental and hydrological integrity.

1. Salt Lake County:

- The county generally enforces a 100-foot setback from the ordinary high-water mark for new developments. This setback is intended to reduce the risk of flooding, support wildlife habitats, and preserve public access to the river.
- Additionally, Salt Lake County has designated a meander corridor along the Jordan River. This corridor accounts for the natural movement and shifting of the river channel over time. Development within this corridor is strictly regulated. Any proposals to build within the meander corridor must include detailed mitigation plans to address the potential impacts of channel meandering and bank scouring. These plans typically involve erosion control measures, bank stabilization techniques, and designs that accommodate future changes in the river's alignment. Included in the appendix are examples of development in the meander corridor and erosion protection.

2. Utah County:

- Utah County typically enforces a 100-foot setback from the high-water mark of the Jordan River and other streams, but has adopted a flexible setback policy for the Jordan River, which is often determined on a case-by-case basis depending on site-specific conditions.
- Developers are encouraged to work closely with planning officials to design projects that balance growth with the protection of riparian ecosystems. Incentives for preserving natural buffers, such as density bonuses or conservation easements, are commonly used.

Both counties emphasize the importance of maintaining or enhancing riparian vegetation along the Jordan River to ensure long-term environmental health. Collaboration with entities such as the Jordan River Commission helps coordinate regional efforts to maintain these standards.

Setback Standards Along the Provo River

The Provo River, a significant waterway flowing through Utah and Wasatch Counties, has its own set of setback requirements aimed at preserving its ecological integrity and mitigating flood risks.

1. Utah County:

- Utah County typically enforces a 100-foot setback from the high-water mark of the Provo River and other streams. This setback is designed to reduce flood hazards, prevent erosion, and protect riparian habitats essential for fish and wildlife.
- Development proposals within this setback are evaluated for potential impacts on river dynamics and ecological health. Restoration or enhancement of riparian vegetation is often required as part of mitigation efforts.

2. Wasatch County:

- Wasatch County generally requires a 50-foot setback from the Provo River to account for the region's topography and the river's meandering nature.

3. Summit County:

- Wasatch County generally requires a 100-foot setback from the Provo River to account for the region's topography and the river's meandering nature.

In all counties, collaborative efforts with the Provo River Watershed Council ensure that setback requirements align with broader conservation and water quality goals. Projects along the Provo River often include measures to stabilize banks, control sedimentation, and enhance fish habitats.

Setback Recommendations from the U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) does not prescribe uniform setback distances across the nation but provides project-specific guidance that significantly influences local setback requirements. The Corps emphasizes the following principles when assessing setbacks:

1. **Flood Risk Management:** USACE recommends maintaining sufficient buffer zones to account for the natural variability of river systems, including the meandering of channels and extreme flood events. These zones help reduce risks to human life and property by allowing rivers to flow naturally and absorb excess water during high-flow periods.
2. **Erosion and Bank Stability:** The Corps often advises setbacks based on detailed geomorphological analyses to identify areas prone to erosion or instability. Their guidance promotes the use of natural and engineered solutions to stabilize riverbanks, particularly when development is planned close to the water.
3. **Ecosystem Preservation:** Recognizing the importance of riparian habitats, USACE supports setbacks that protect critical ecosystems. These buffers help maintain biodiversity, improve water quality, and sustain natural watercourse processes.
4. **Project-Specific Recommendations:** The Corps works with local and state agencies to establish setbacks tailored to specific river systems. These recommendations are often informed by FEMA floodplain maps, hydrological models, and historical data on river behavior.

Influence on Local Policies

In many cases, USACE recommendations serve as a foundation for local setback requirements. For example:

- Local governments often align their setback policies with USACE guidelines to ensure compliance with federal regulations, especially for projects involving federal funding or permits.
- Projects requiring Section 404 permits under the Clean Water Act are evaluated based on USACE criteria, which often include considerations for maintaining adequate setbacks.

Incorporating USACE principles into setback policies ensures that local regulations are grounded in sound science and best practices for flood risk reduction and environmental stewardship. These recommendations complement efforts like Weber County's setback and the meander corridor approach employed by Salt Lake County along the Jordan River.

FEMA Recommendations on Setbacks

FEMA does not prescribe specific setback distances for structures from rivers or floodplains. Instead, it provides guidelines and encourages communities to establish their own setback standards to enhance flood risk management and environmental protection. These standards define minimum distances that structures must be positioned from river channels and coastal shorelines. Setbacks can be defined by vertical heights or horizontal distances. While floodplain boundaries are defined by vertical measures, horizontal setbacks also provide protection from flood damage, especially in coastal areas where the effects of waves decrease further inland. In riverine situations, setbacks prevent disruption to the channel banks and protect riparian habitat. Such setbacks are frequently created to serve as isolation distances to protect water quality, and stream and wetland resources.

FEMA also highlights the importance of setbacks in their guidance documents, which stress the value of preserving natural floodplain functions. Their recommendations are tailored to support effective local floodplain management practices while encouraging communities to adopt forward-looking policies.

FEMA's Community Rating System (CRS) credits communities that implement higher regulatory standards, including setbacks. This encourages local governments to adopt setback policies that exceed minimum NFIP requirements, thereby enhancing floodplain management and potentially reducing flood insurance premiums for residents.

In addition, FEMA supports integrating setbacks into hazard mitigation planning efforts. Communities are urged to use setbacks as part of strategies that account for long-term changes in climate and land use. By doing so, they can enhance resilience against future flooding events and protect vital ecosystems.

In summary, while FEMA does not mandate specific setback distances, it supports and incentivizes communities to establish and enforce setback standards tailored to their local conditions and flood risk profiles.

Summary of Setback Investigation

Setback requirements along rivers are essential regulatory measures to mitigate flood risks, prevent erosion, and preserve ecological health. These standards establish buffer zones between waterways and developments, protecting public safety, property, and natural habitats. Various counties in Utah, including Weber, Salt Lake, Utah, Wasatch, and Summit, have implemented distinct setback policies tailored to their local conditions. For instance, Weber County increased its setback from 100 feet to 300 feet along the Weber River. Similarly, Salt Lake and Utah Counties maintain 100-foot setbacks along the Jordan River, with Salt Lake County incorporating a meander corridor to accommodate the river's natural shifts.

The Provo River has setback standards that differ by county. Utah County enforces a 100-foot setback, while Wasatch County requires 50 feet, and Summit County also applies a 100-foot buffer. These policies aim to balance development with ecological preservation and flood risk reduction. Development within these setbacks often necessitates detailed mitigation plans and collaboration with local planning officials. Federal agencies like the U.S. Army Corps of Engineers (USACE) and FEMA influence these local policies by offering guidance on setbacks to ensure resilience against flood risks and environmental degradation.

FEMA does not prescribe universal setback distances but emphasizes their importance in preserving floodplain functions and protecting water quality. Communities implementing setbacks aligned with FEMA's Community Rating System (CRS) may benefit from reduced flood insurance premiums. The USACE also recommends setbacks tailored to specific river systems, considering factors like flood variability, erosion risk, and ecosystem preservation. These federal recommendations complement local regulations, ensuring that setback policies are grounded in science and aligned with best practices for flood risk management and environmental stewardship.

Determining Setback Distances

The determination of appropriate setback distances involves balancing environmental, engineering, and social considerations, as discussed above. Factors influencing setback requirements include:

1. Hydrological and Geomorphological Analysis:

- River flow characteristics, including peak discharge and flood frequency.
- Bank stability assessments to identify areas prone to erosion or failure.
- Historical and predictive floodplain mapping, including FEMA 100-year floodplain data.
- Rivers naturally shift their course over time. Setbacks help account for this movement and prevent development from being encroached upon.

2. Ecological Considerations:

- Importance of preserving riparian vegetation for habitat and water filtration.
- The role of setback areas in maintaining natural watercourse processes.
- Natural vegetation helps stabilize the riverbank, reducing erosion and sedimentation. Setbacks help maintain this natural protection.

3. Community and Development Goals:

- Balancing growth and land use with public safety and environmental preservation.
- Alignment with state and federal guidelines or funding conditions.
- Include public pathways or open spaces within setbacks to enhance community engagement while preserving the river corridor.
- Instead of having a uniform setback, multi-tiered zones could be developed, which could prohibit permanent structures in the highest-risk areas, but allows for conditional approval in lower risk areas or development with mitigation measures.

To ensure setbacks are evidence-based, collaboration between hydrologists, ecologists, urban planners, and engineers is essential. Tools such as GIS modeling and field assessments provide critical data to inform decisions.

Development Near Rivers

Development near rivers requires careful planning and adherence to regulatory frameworks to balance growth with environmental and safety concerns. When developing near rivers, certain scenarios may allow for development activities closer to the banks if precautions are taken. Some of these precautions include:

1. **Mitigation Measures:** Developers must implement strategies to mitigate potential impacts on river dynamics and ecosystems. Common measures include:
 - **Erosion Control:** Installing engineered solutions such as retaining walls, riprap, buried riprap trench, or vegetative buffers to stabilize banks. These measures can significantly reduce the risk of bank collapse and sedimentation in waterways.
 - **Floodproofing:** Designing structures with elevated foundations, flood barriers, or permeable materials to withstand periodic flooding and minimize water damage to property.
 - **Riparian Restoration:** Enhancing natural habitats within and around the river to offset environmental impacts. This includes planting native vegetation, creating wetlands, and ensuring connectivity between aquatic and terrestrial ecosystems.
2. **Regulatory Compliance:** Any development near a river must comply with local, state, and federal regulations, including:
 - Obtaining permits for construction activities that may affect water quality or riparian ecosystems, such as Section 404 permits under the Clean Water Act.
 - Demonstrating alignment with FEMA and USACE guidelines for floodplain management and environmental protection, ensuring that the development does not increase flood risks or adversely affect neighboring properties.
3. **Site-Specific Planning:** Development proposals may be informed by detailed site assessments, including:
 - **Hydraulic/Hydrological Modeling:** Using advanced modeling techniques to predict the extent and impact of flood events and identify areas of potential inundation.
 - **Environmental Impact Studies:** Conducting thorough analyses to evaluate the potential risks to local flora and fauna and propose strategies to mitigate these impacts.
 - **Geotechnical Analyses:** Assessing soil stability, subsurface conditions, and erosion potential to ensure that the land can support the proposed development.
4. **Community Engagement:** Developers are encouraged to engage with local stakeholders to address concerns and incorporate feedback. Collaborative planning can result in designs that balance development needs with community values and environmental priorities. Transparent communication with community members can help mitigate opposition and foster a sense of shared responsibility.

By adhering to these principles, developers can responsibly utilize land near the river while minimizing risks, ensuring regulatory compliance, and preserving the integrity of riverine ecosystems. Thoughtful, site-sensitive design and proactive stakeholder collaboration are essential for achieving a balance between development objectives and environmental sustainability.

Summary and Recommendations

BC&A was tasked with evaluating the effective FEMA Special Flood Hazard Area (SFHA) mapping, providing guidance on options to amend FEMA SFHA designations if needed, investigating setback requirements for Weber County and other major rivers in Utah, determining how setbacks can be established, and discussing best practices for development near rivers.

FEMA Review

Our review of the effective FEMA floodplain mapping revealed that most of the proposed development lies outside the 1-percent annual chance floodplain but within the 0.2-percent annual chance floodplain. Consequently, no hydraulic analysis or Letter of Map Revision (LOMR) is required unless they want to fill in an old oxbow or critical facilities are part of the development, which would need protection from the 0.2-percent annual chance flood event.

Additionally, since the project site is within a designated floodplain, a floodplain development permit will still be necessary. Additionally, the Federal Flood Risk Management Standard (FFRMS) was considered as part of our analysis. While the FFRMS can impact federal projects or developments involving FHA loans, it should not affect most of this project, as the 1-percent chance floodplain is confined to the river channel except in an old oxbow which could potentially be filled in.

Setback Investigation

River setback requirements play a crucial role in ensuring public safety, preserving natural resources, and fostering sustainable development. Weber County's recent adoption of a 300-foot setback sets a stricter standard compared to other communities in Utah. Developers near rivers or within setback zones must prioritize comprehensive planning, compliance with regulatory guidelines, and collaboration with community stakeholders to achieve balanced growth while protecting environmental and public interests.

Development Near Rivers

Development near rivers necessitates meticulous planning to balance growth with environmental preservation and safety. While development near rivers is normally regulated, activities may be permitted with proper mitigation measures, such as erosion control, floodproofing, and riparian restoration. Developers must comply with local, state, and federal regulations, including obtaining permits under the Clean Water Act and aligning with FEMA and USACE guidelines. Site-specific assessments, such as hydrological modeling, environmental impact studies, and geotechnical analyses, are crucial for informed planning and minimizing risks. Community engagement plays a vital role, fostering collaboration and addressing local concerns. By adhering to these principles, developers can responsibly navigate setback regulations, support sustainable development, and preserve riverine ecosystems.

Recommendations for the Project Area

The developer recognizes the importance of the 300-foot setback in promoting safety and environmental stewardship. However, they would like to develop within the 300-foot setback while maintaining a distance of at least 100 feet from the river, in alignment with the previous setback requirement and because the 100yr floodplain is contained in the channel. Below are the recommended requirements for developing within the 300-foot setback but at least 100 feet away from the river:

1. **Enhanced Mitigation Measures:** To offset potential risks, we suggest the following measures:

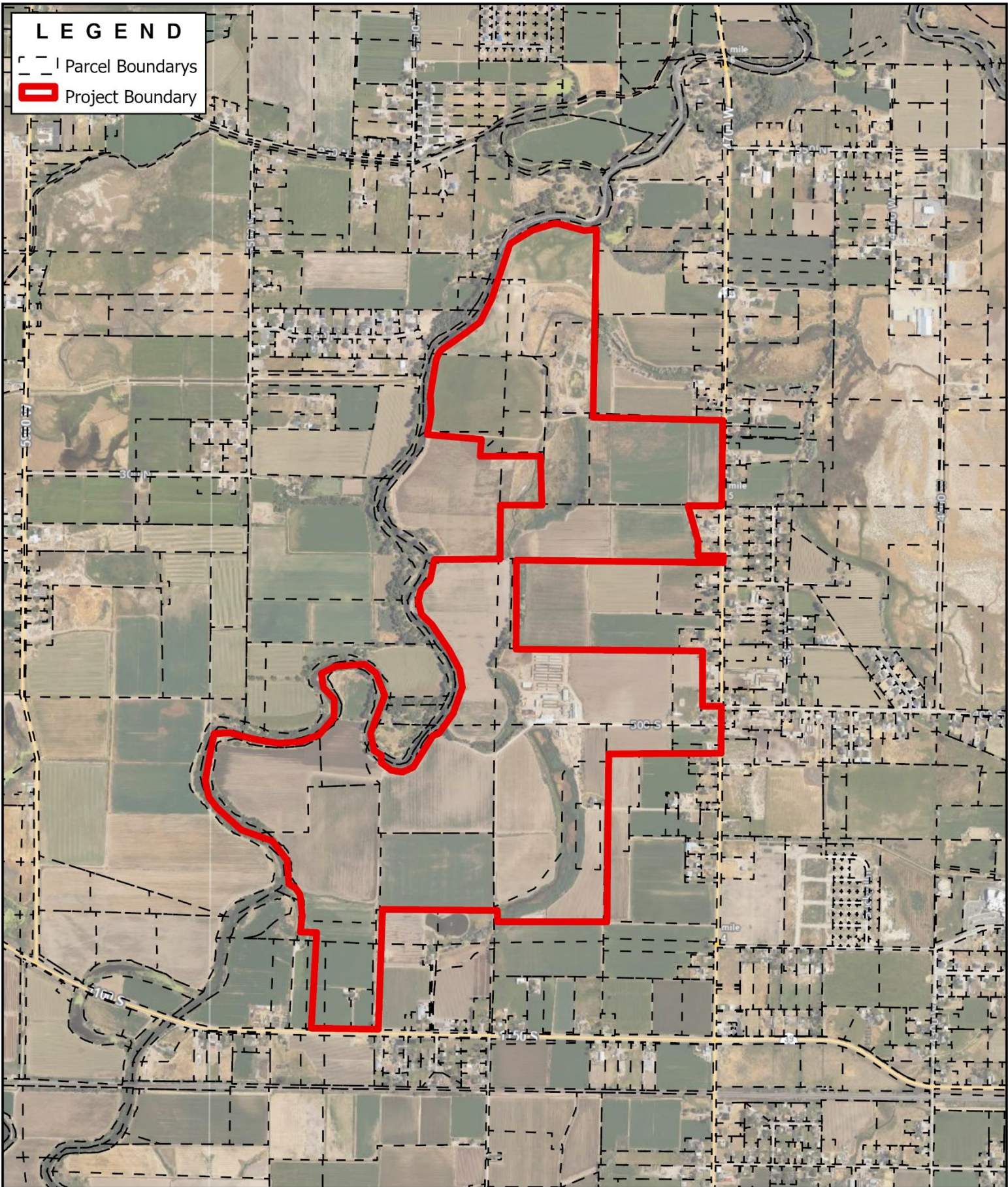
- **Riparian Zone Preservation:** Maintaining and enhancing the vegetative buffer within 100 feet of the river to prevent erosion and protect water quality.
 - **Erosion Control Measures:** Implementing engineered solutions recommended by a third party engineer such as riprap, vegetative stabilization, buried riprap trench, or other mitigation measures to minimize the risk of bank instability or the river meandering, as needed, within the 100 foot set back.
 - **Floodproofing Design:** Constructing buildings with elevated foundations, flood barriers, or other adaptive designs to withstand potential flooding.
2. **Hydrological and Environmental Studies:** Conduct assessments as recommended by a third party engineer, including:
 - **Hydraulic Modeling:** Evaluating the potential impacts of development on flood risk and river dynamics.
 - **Environmental Impact Assessment:** Identifying any potential effects on the local environment and water quality, along with proposed mitigation strategies.
 3. **Stormwater Management Plans:** Ensure all stormwater runoff is collected and safely conveyed to the river system.
 4. **Permit and Compliance Assurance:** Commit to obtaining all necessary permits from local, state, and federal agencies, including:
 - Compliance with FEMA and USACE guidelines for floodplain management.
 - Adherence to the Clean Water Act requirements to protect water quality and aquatic habitats.
 5. **Collaborative Approach:** Partner with the County and other stakeholders to develop:
 - Community engagement initiatives to address concerns and foster support for the project.

By implementing these measures, the developer seeks to responsibly balance development needs with environmental stewardship and safety concerns while honoring the County's revised setback policies.

Conclusion

River setback requirements are essential tools for safeguarding public safety, protecting natural resources, and supporting sustainable development. While the developer acknowledges the rationale behind setback policies, they propose adhering to a 100-foot setback requirement with mitigation measures as recommended by a third-party engineer to address potential risks for the project area.

This approach provides a viable compromise, enabling development to proceed responsibly while upholding the principles of floodplain management. By working collaboratively with the County and other stakeholders, the developer aims to set a precedent for innovative and sustainable riverfront development that aligns with community values and environmental priorities.



LEGEND

-  Parcel Boundaries
-  Project Boundary




BOWEN COLLINS
& ASSOCIATES

Project Location

The Black Pine Group
Weber River Setback Investigation

NORTH:



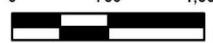
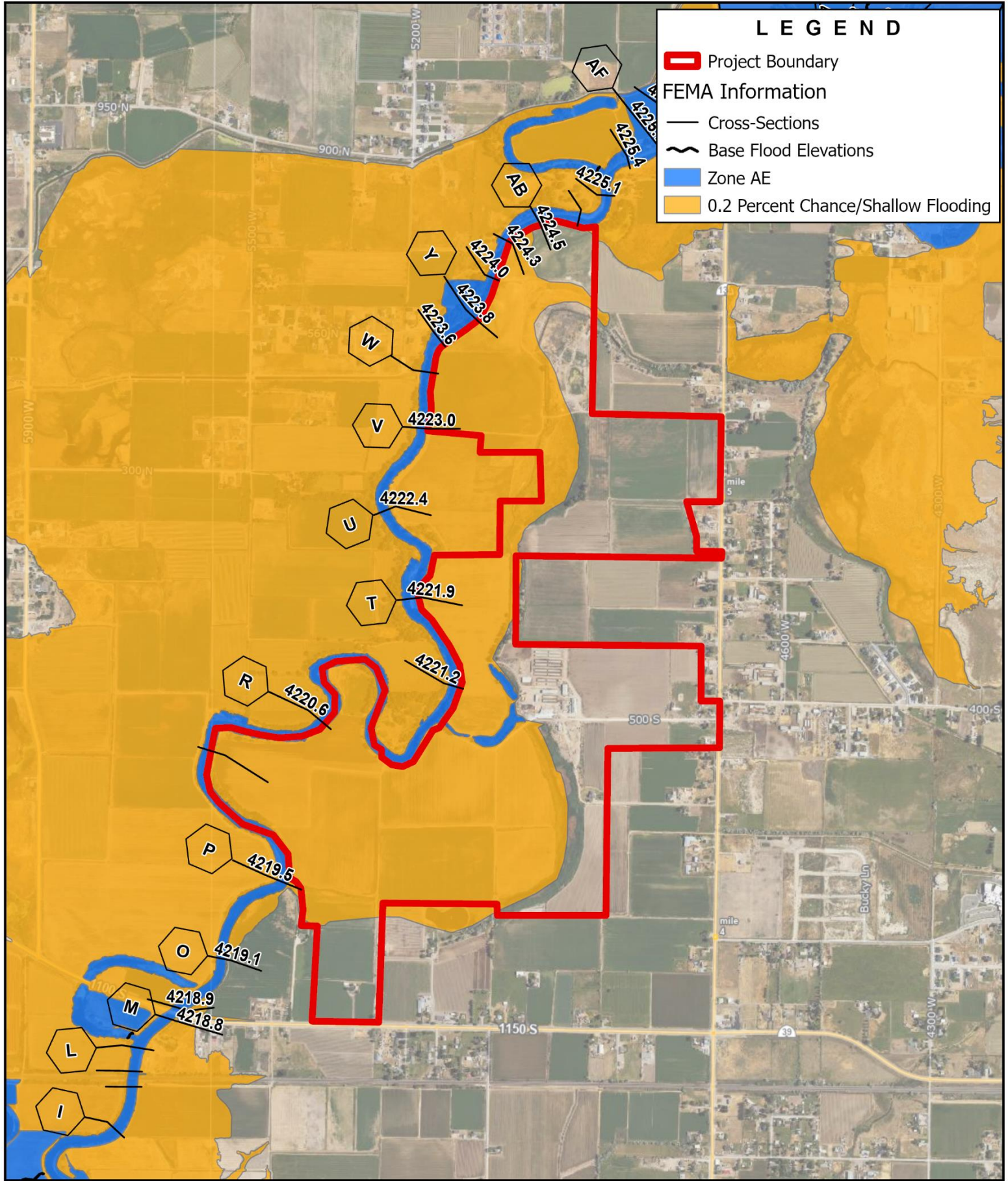
SCALE:
0 750 1,500
 Feet

FIGURE NO.
1



LEGEND

- Project Boundary
- FEMA Information**
- Cross-Sections
- Base Flood Elevations
- Zone AE
- 0.2 Percent Chance/Shallow Flooding

BOWEN COLLINS
& ASSOCIATES

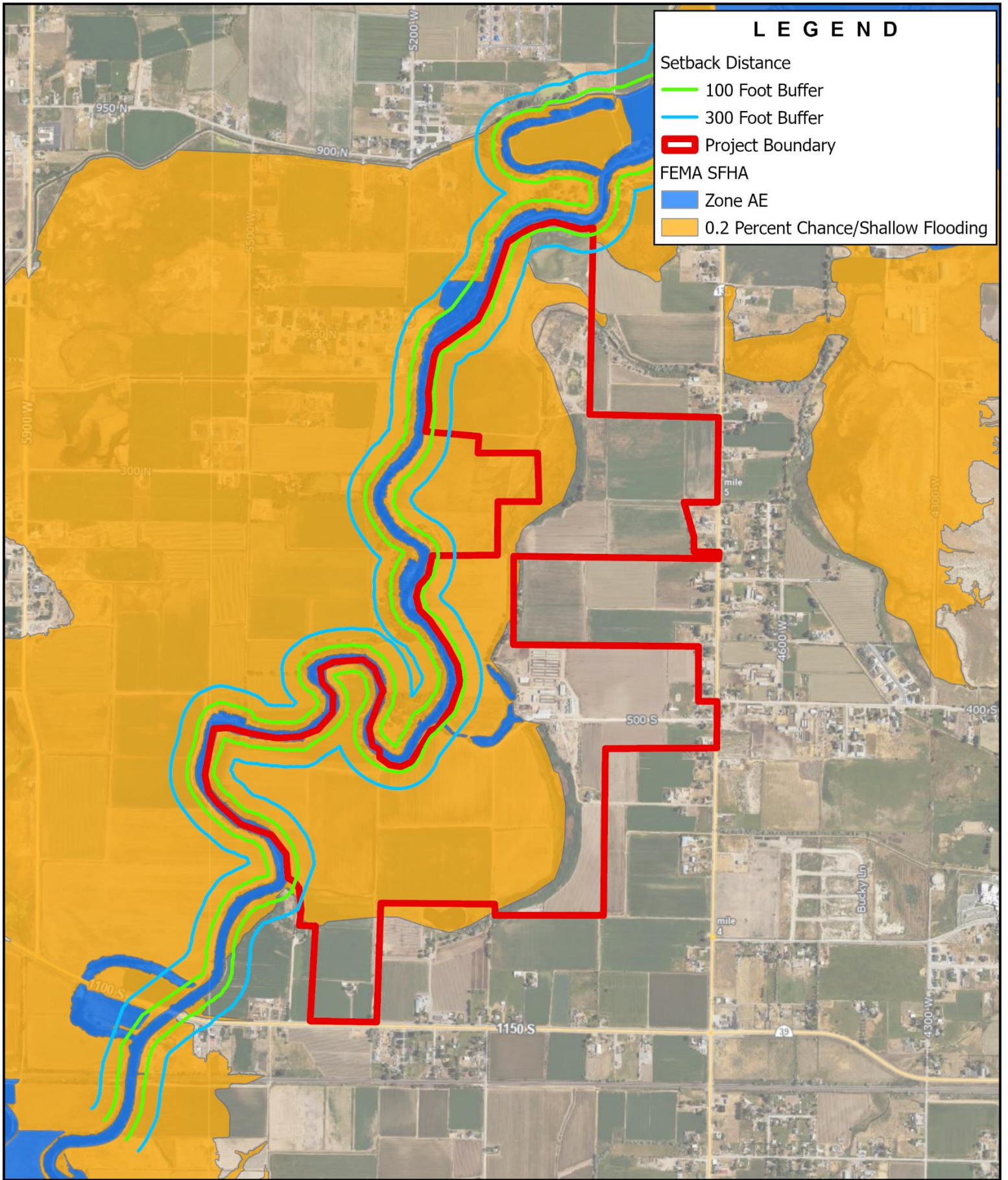
Current Effective SFHA

The Black Pine Group
Weber River Setback Investigation

NORTH:

SCALE:
0 750 1,500
Feet

FIGURE NO.
2



LEGEND

Setback Distance

- 100 Foot Buffer
- 300 Foot Buffer
- Project Boundary

FEMA SFHA

- Zone AE
- 0.2 Percent Chance/Shallow Flooding




BOWEN COLLINS
& ASSOCIATES

Setback Distances

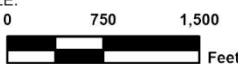
The Black Pine Group

Weber River Setback Investigation

NORTH:



SCALE:





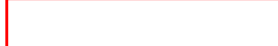
0 750 1,500
Feet

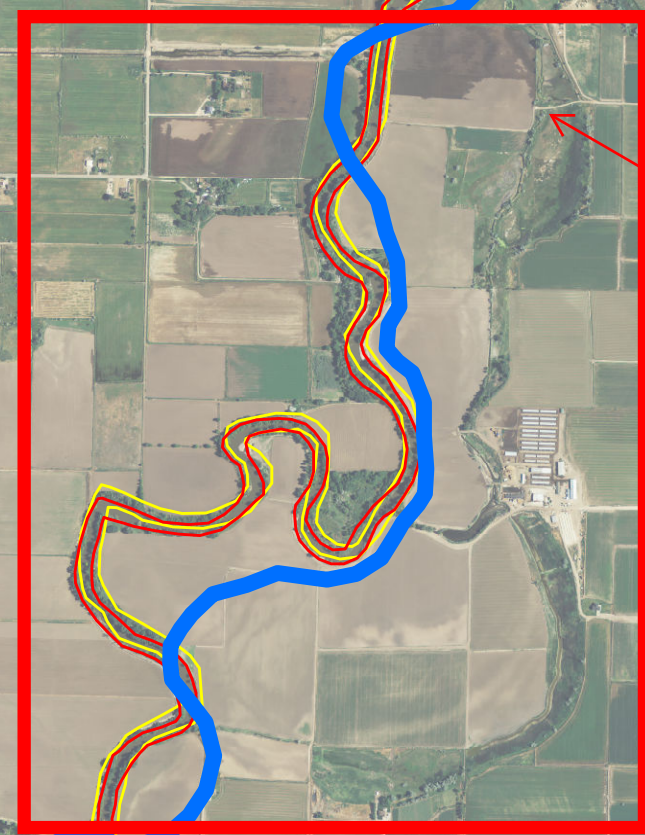
FIGURE NO.

3

APPENDIX A
Additional Data

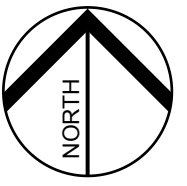
Legend

-  1855 Weber River
-  1955 River Boundary
-  2011 River Boundary

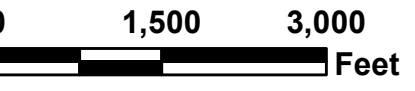


Project Area

NORTH:



SCALE:

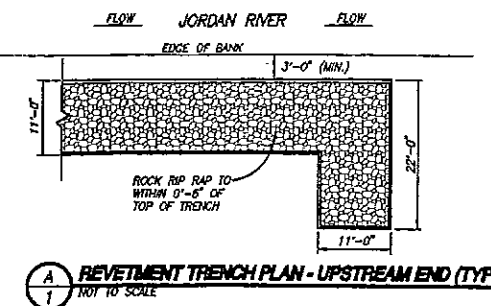
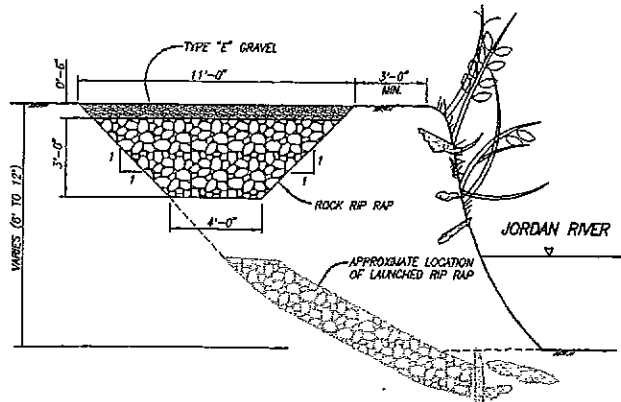


1855 & 1955 AND 2011 WEBER RIVER BOUNDARY - 2011 AERIAL

WEBER COUNTY
WEBER COUNTY
 EWP

Bowen Collins
 & Associates, Inc.
 CONSULTING ENGINEERS

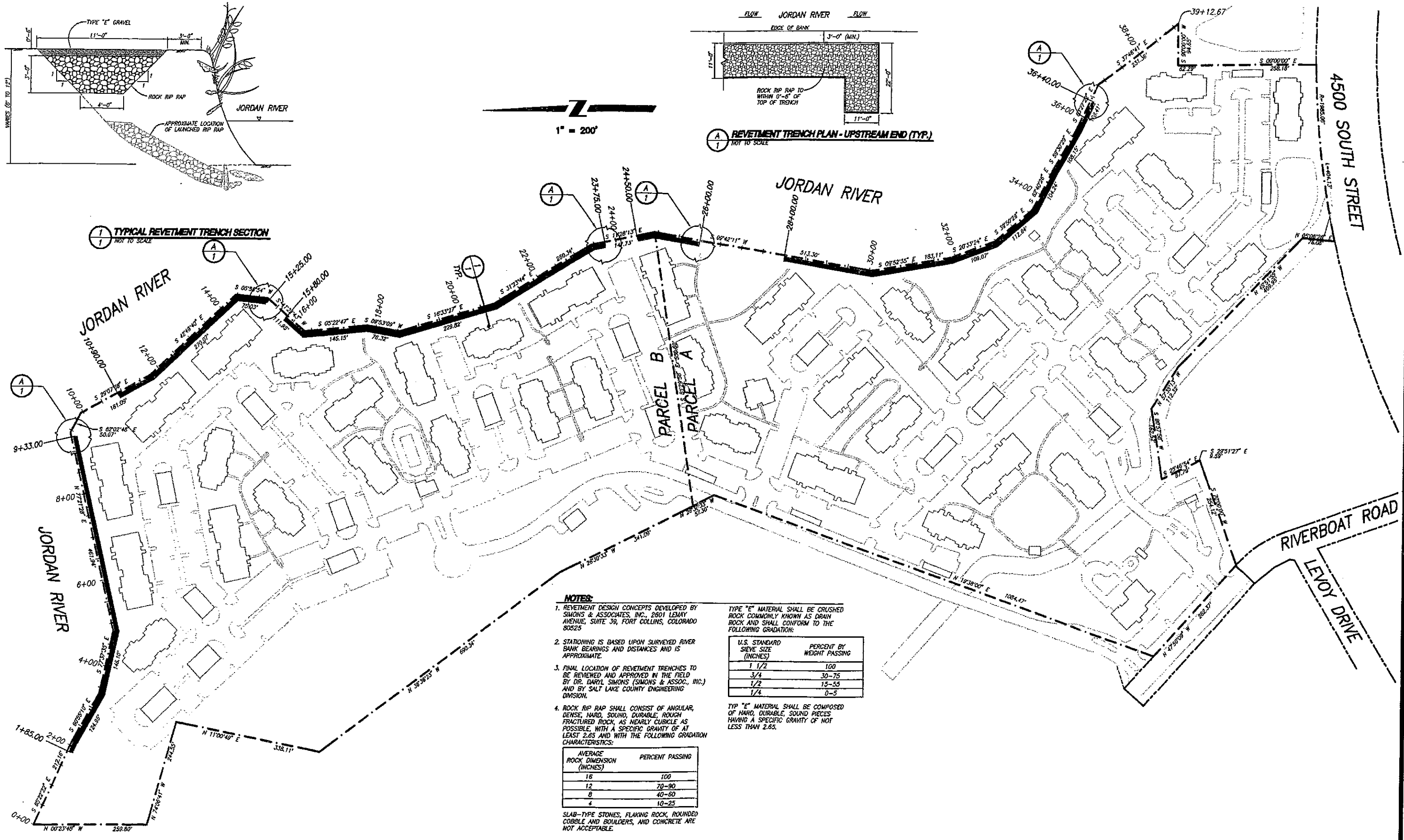
FIGURE NO.
1



TYPICAL REVETMENT TRENCH SECTION
NOT TO SCALE

REVETMENT TRENCH PLAN - UPSTREAM END (TYP.)
NOT TO SCALE

1" = 200'



NOTES:

1. REVETMENT DESIGN CONCEPTS DEVELOPED BY SIMONS & ASSOCIATES, INC., 2001 LEVAY AVENUE, SUITE 39, FORT COLLINS, COLORADO 80525
2. STATIONING IS BASED UPON SURVEYED RIVER BANK BEARINGS AND DISTANCES AND IS APPROXIMATE.
3. FINAL LOCATION OF REVETMENT TRENCHES TO BE REVETTED AND APPROVED IN THE FIELD BY DR. BARRY SIMONS (SIMONS & ASSOC., INC.) AND BY SALT LAKE COUNTY ENGINEERING DIVISION.
4. ROCK RIP RAP SHALL CONSIST OF ANGULAR, DENSE, HARD, SOUND, DURABLE, ROUGH FRACTURED ROCK, AS NEARLY CUBIC AS POSSIBLE, WITH A SPECIFIC GRAVITY OF AT LEAST 2.65 AND WITH THE FOLLOWING GRADATION CHARACTERISTICS:

TYPE "E" MATERIAL SHALL BE CRUSHED ROCK COMMONLY KNOWN AS DRAIN ROCK AND SHALL CONFORM TO THE FOLLOWING GRADATION:

U.S. STANDARD SIEVE SIZE (INCHES)	PERCENT BY WEIGHT PASSING
1 1/2	100
3/4	30-75
1/2	15-55
1/4	0-5

TYP "E" MATERIAL SHALL BE COMPOSED OF HARD, DURABLE, SOUND PIECES HAVING A SPECIFIC GRAVITY OF NOT LESS THAN 2.65.

AVERAGE ROCK DIMENSION (INCHES)	PERCENT PASSING
18	100
12	70-90
8	40-60
4	10-25

SLAB-TYPE STONES, FLAKING ROCK, ROUNDED COBBLE AND BOULDERS, AND CONCRETE ARE NOT ACCEPTABLE.