Boulder County Parks & Open Space

St. Vrain Creek Breaches Restoration Alternatives Discussion

July 12, 2016

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Engineering Analytics, Inc.

Lidstone and Associates, Inc.

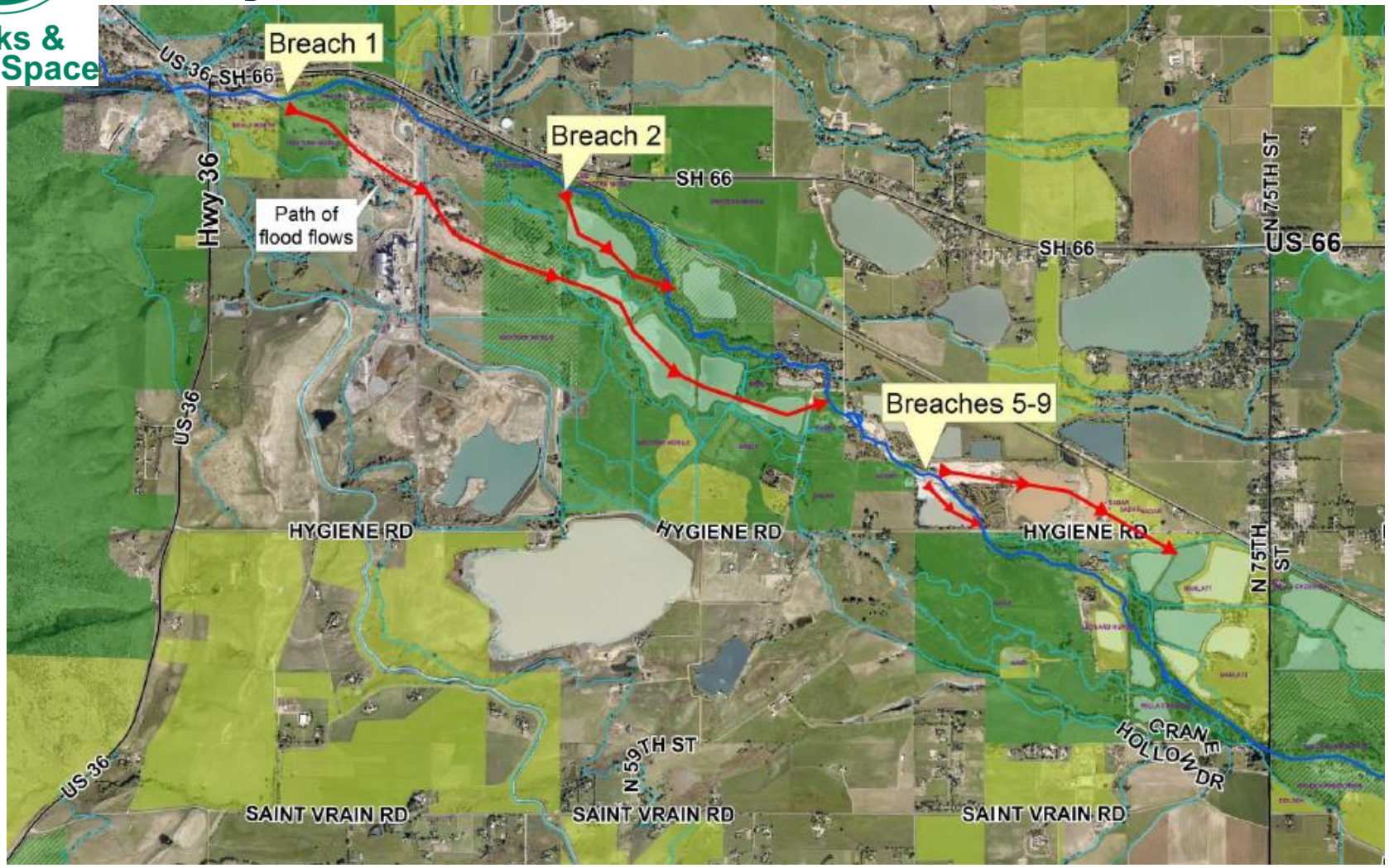
WENCK ASSOCIATES

ecos ecosystem services LLC

Trihydro

Boulder County
Parks & Open Space

Project Overview



Engineering Analytics, Inc.
www.enganalytics.com

Colorado EWP Program Vision

- To implement watershed recovery projects that reduce risk to life and property, enhance riparian ecosystems, and generate long-term stream system resilience through a collaborative, watershed-based approach that incorporates the needs of diverse stakeholders.

Boulder County
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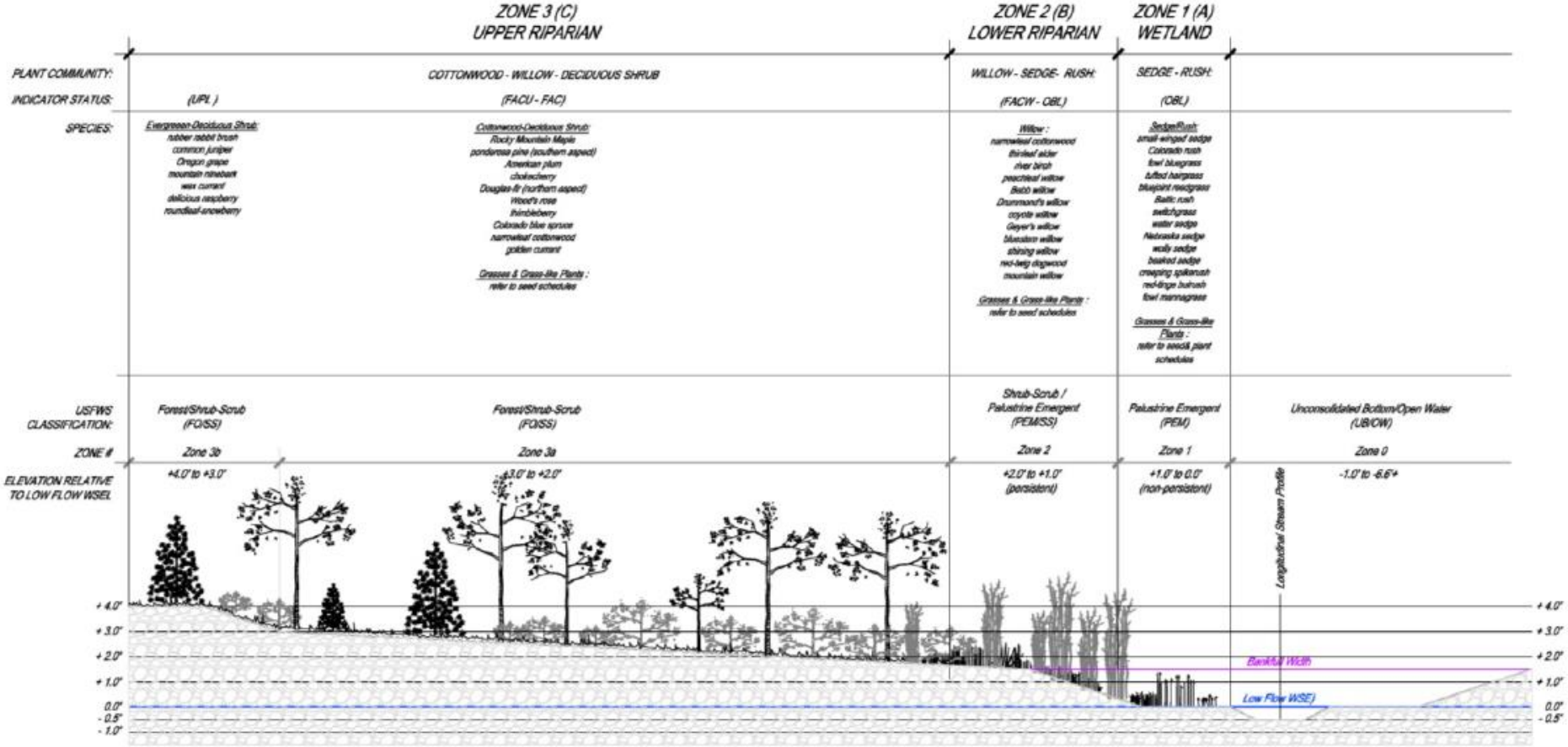
Stream Functions Pyramid

Restoration – Typical Cross Section



NOTES:

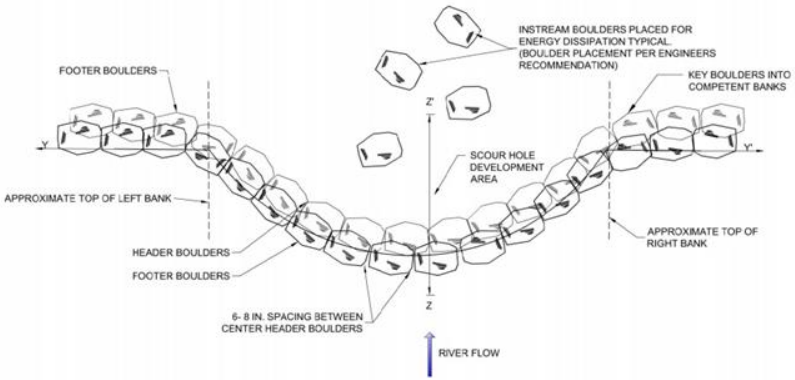
1. ALL ZONES ARE TO BE SEEDED WITH ONE BROAD-SPECTRUM SEED MIX CONTAINING THE SPECIES SHOWN ON THE SEED SCHEDULES.
2. REFER TO PLANTING AND SEEDING SCHEDULES FOR SPECIES SIZE/FORM AND QUANTITY.
3. UPLAND SPECIES MAY BE FOUND AND LOCATED IN WETLAND AREAS, AND CONVERSELY WETLAND SPECIES IN UPLAND AREAS DEPENDING ON FIELD CONDITIONS ESTABLISHED DURING GRADING OPERATIONS. PLANT ZONATION SHOWN IS A GENERAL GUIDELINE. TRANSITION OR EXTENSION OF SPECIES BETWEEN ZONES MAY VARY DEPENDING ON ACTUAL FIELD CONDITIONS, SLOPE, HYDROLOGY, MICRO-HABITAT, SOIL TEXTURE & MOISTURE CONDITIONS. THE ECOLOGIST OVERSEEING PLANTING OPERATIONS MUST MAKE DISCRETIONARY CALLS ON PLANT LOCATIONS CONSIDERING THAT OVERFLOW SWALES INCLUDE ZONE 1(A) WETLAND PLANT MATERIALS THAT MAY EXTEND UP INTO ZONE2(B). ZONE 2(B) PLANT MATERIALS MAY EXTEND DOWN INTO ZONE 1(A). ZONE 3(C) PLANTS MAY EXTEND IN TO ZONE 2(B).

Restoration – Biotechnical Bank Stabilization

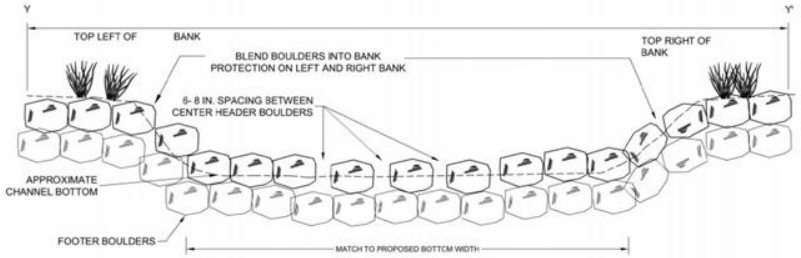
Restoration Details – Cross Vanes

CROSS VANE PURPOSE:

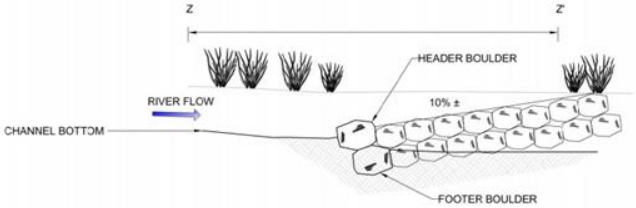
- GRADE CONTROL
- CENTRALIZING FLOW
- ENERGY DISSIPATION
- ENCOURAGE POOL AND RIFFLE FORMATION



1/1 ROCK CROSS VANE - PLAN VIEW
NOT TO SCALE



2/1 ROCK CROSS VANE - SECTION VIEW Y-Y'
NOT TO SCALE



3/1 ROCK CROSS VANE - SECTION VIEW Z-Z'
NOT TO SCALE

GENERAL NOTES

PRELIMINARY DRAWINGS TO SHOW CONCEPT ONLY. NOT FOR CONSTRUCTION

NOTES

1. ROCK CROSS VANE BOULDERS SHALL BE GENTLY AND UNIFORMLY SLOPED FROM CENTER OF CHANNEL TO TOP OF BANK. ENGINEER MAY MODIFY PLACEMENT OF BOULDERS BASED ON SITE CONDITIONS AT TIME OF CONSTRUCTION.
2. ALL BOULDERS SHALL BE TIGHTLY SPACED EXCEPT FOR CENTER HEADER BOULDERS WHICH SHALL HAVE 6 TO 8 IN. GAPS. ALL FOUNDATION BOULDERS SHALL BE TIGHTLY SPACED.
3. CENTER HEADER BOULDERS TO STICK UP 1.5 FT. ABOVE CHANNEL BED. REMAINDER OF HEADER BOULDERS TO STICK UP 2 FT. MAXIMUM ABOVE CHANNEL BED.
4. ROCK VANES AND ROCK CROSS VANES SHOULD BE KEYED INTO THE LEFT AND RIGHT BANKS.
5. EACH ROCK LAYER SHALL BE KEYED OR LOCKED INTO UNDERLYING LAYER.
6. IN AREAS WHERE CHANNEL BANKS ARE DEVELOPED FROM FILL, BANKS SHALL BE COMPACTED TO 95% STANDARD PROCTOR PRIOR TO ROCK INSTALLATION.

Lidstone and Associates, Inc.
WENCK
Lidstone and Associates - A Wenck Company

ST. VRAIN BREACHES PROJECT
Restoration Alternatives
DETAILS

PROJECT NUMBER: COEA101	DESIGNED/DRAWN: ZSB
DRAWN DATE: 7/12/16	CHECKED: ELR
	APPROVED: CDL

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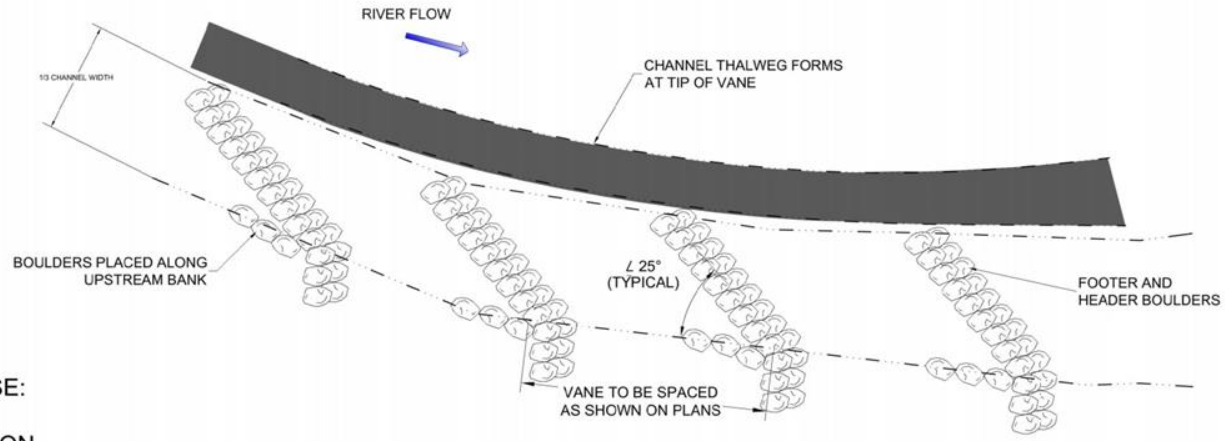
ROCK CROSS VANE DETAIL

REVISIONS:

SHEET 1

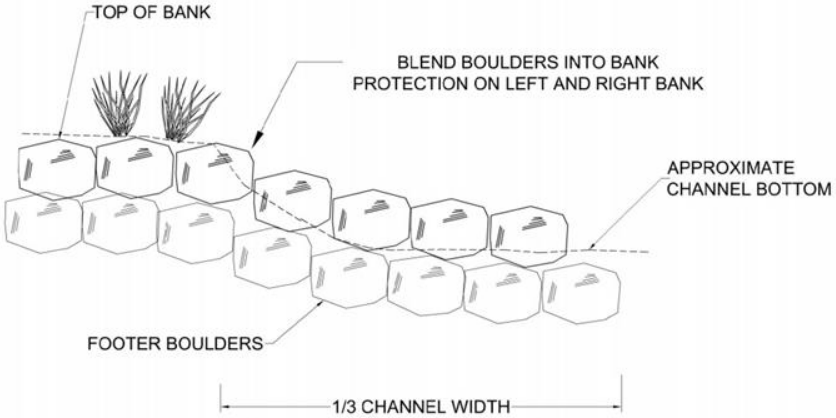
Restoration Details - Vanes



ROCK VANE PURPOSE:

- BANK PROTECTION
- FORMATION OF THALWEG
- REDIRECT NEAR BANK VELOCITIES
- SEDIMENT STORAGE

1/2 TYPICAL ROCK VANE DETAIL - PLAN VIEW
NOT TO SCALE



2/2 TYPICAL ROCK VANE DETAIL - PROFILE VIEW
NOT TO SCALE

BEFORE

AFTER

GENERAL NOTES

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ROCK VANE DETAIL

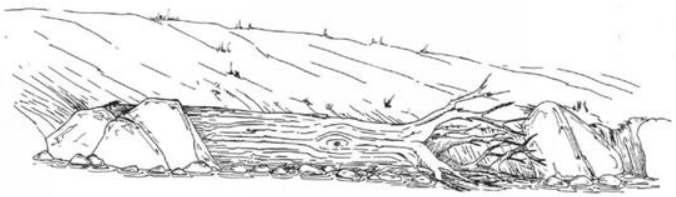
REVISIONS:

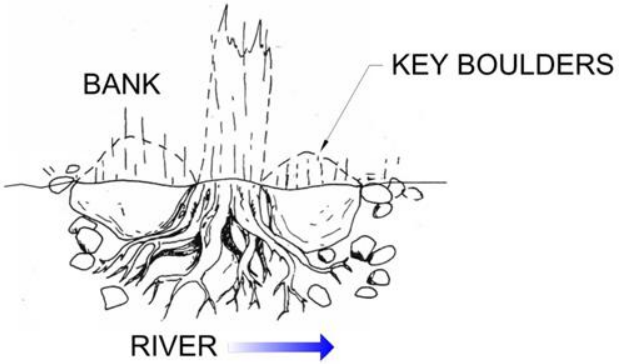
SHEET 2

Restoration Details – Root Wads

ROOT WAD PURPOSE:

- BANK PROTECTION
- HABITAT IMPROVEMENT
- LIMITED STORAGE OF SEDIMENT





GENERAL NOTES

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NOTES

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ACAD FILE: Z:\PROJECT\COEA101\ALTERNATIVES\COEA101 DETAILS.DWG	

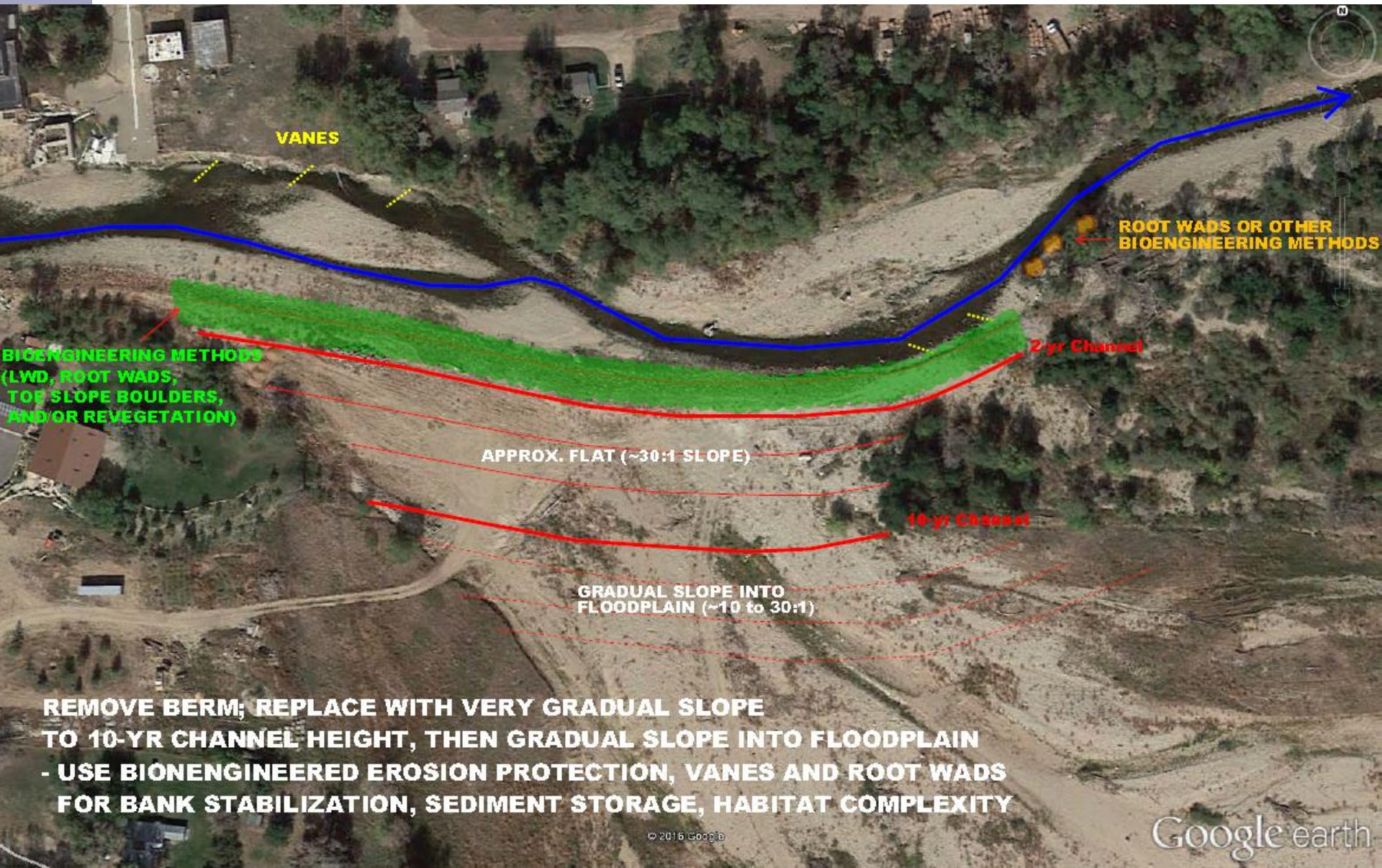
ROOT WAD
DETAIL

REVISIONS:

SHEET
4

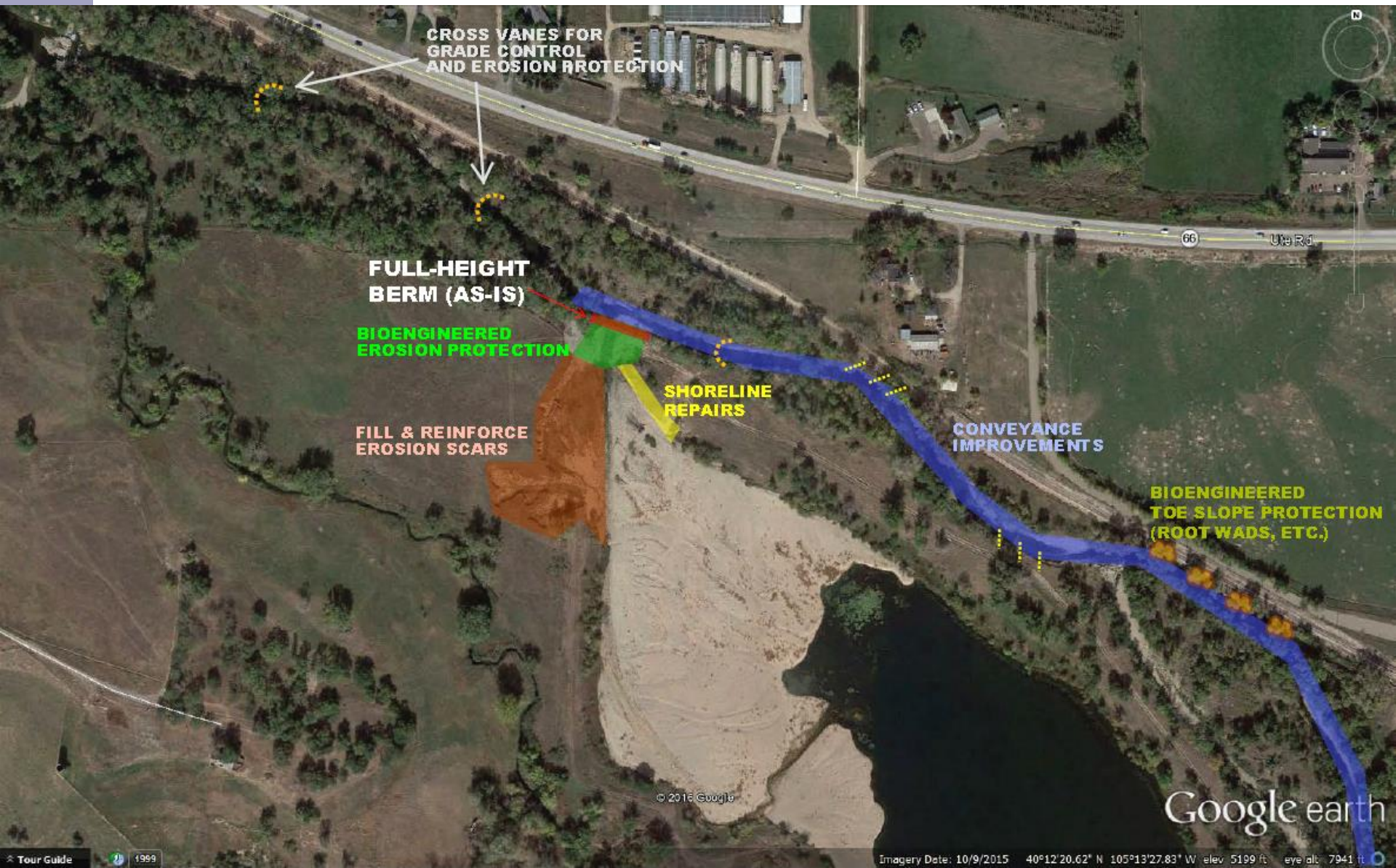
BREACH 1 – No Action plus Stream Restoration

BREACH 1 – Limited Setback Berm

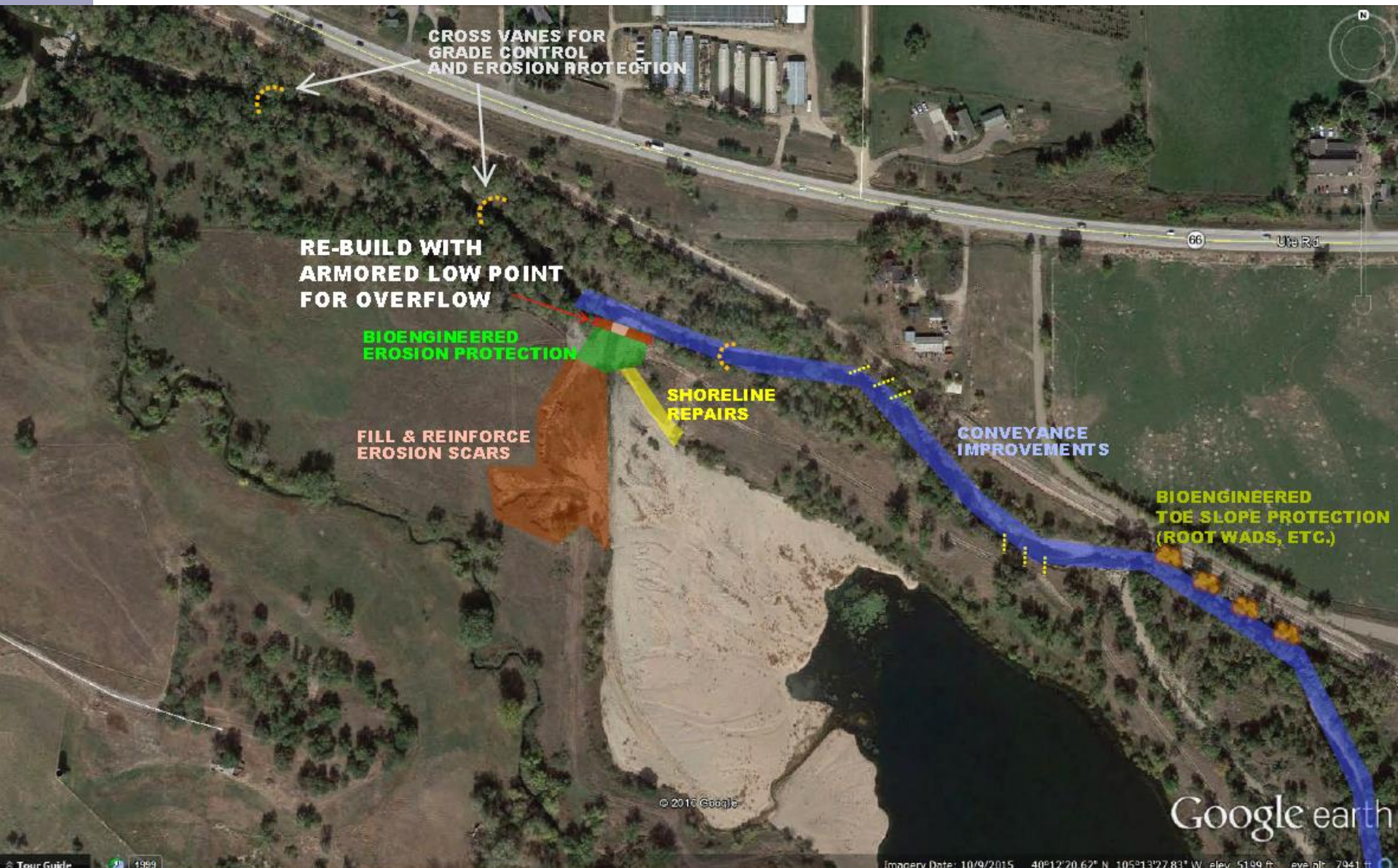


BREACH 1 – Full Floodplain Access

BREACH 2 – Maintain Berm plus Stream Restoration

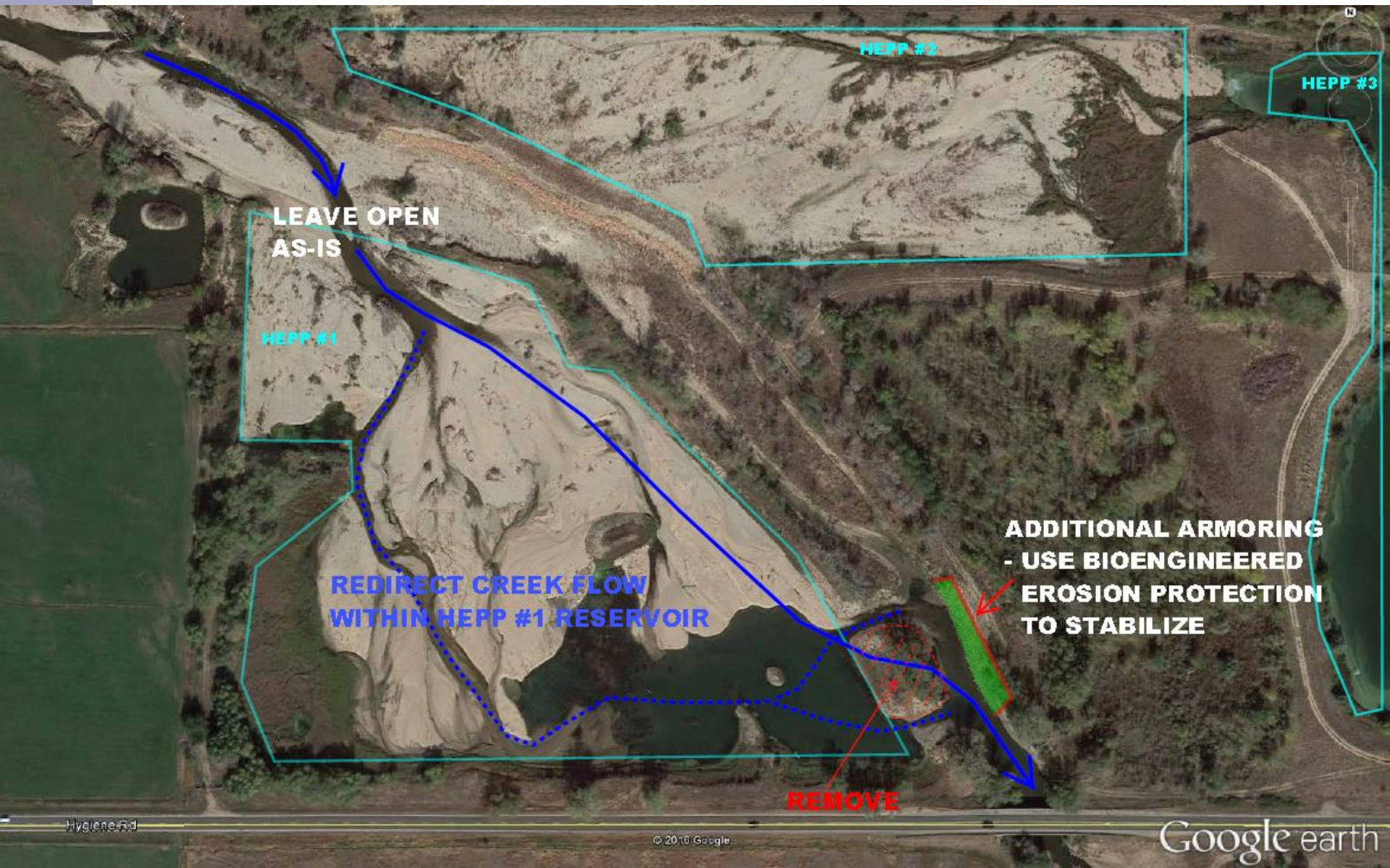


BREACH 2 – Overflow Berm plus Stream Restoration

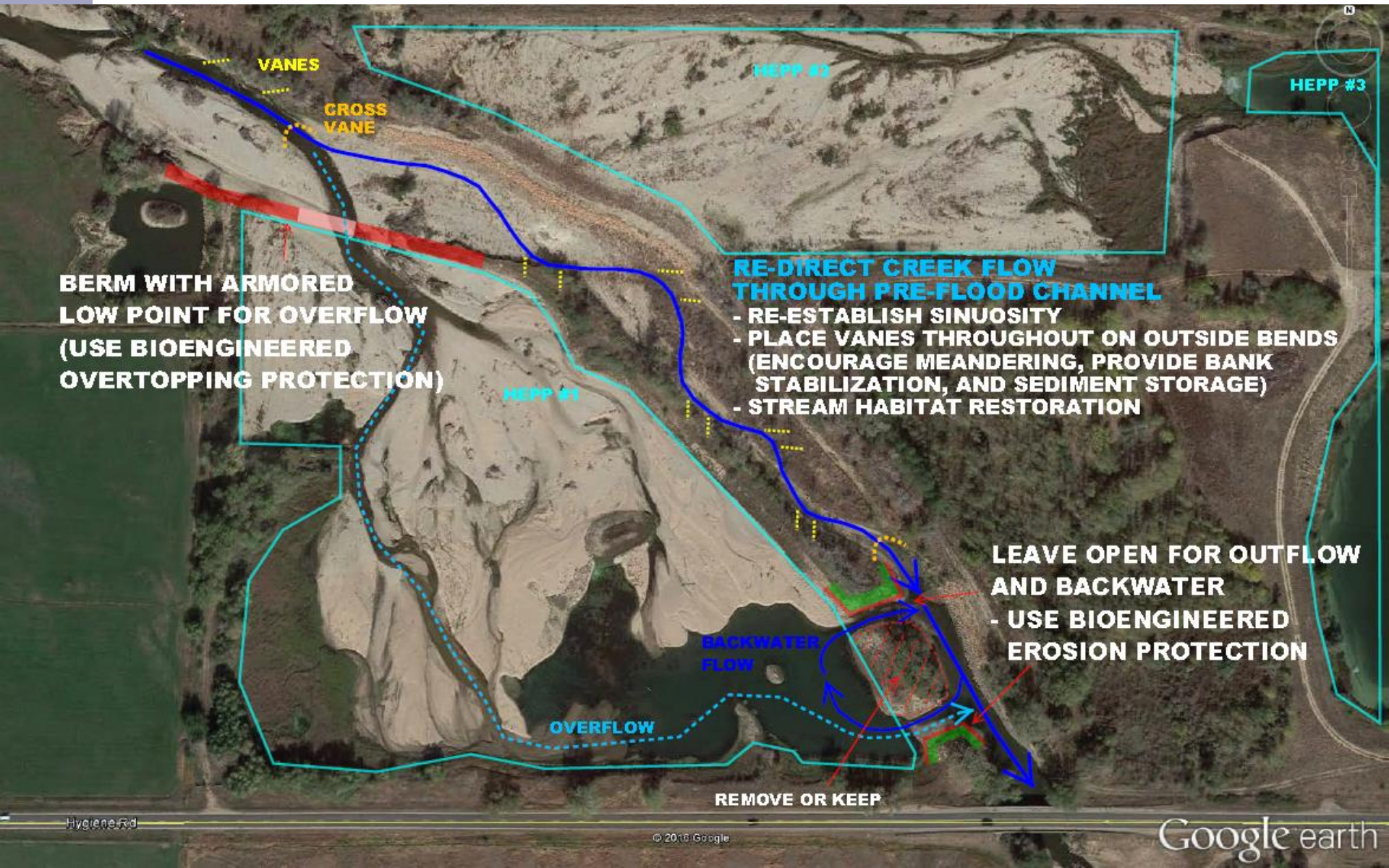


BREACHES 5,6,8,9 – No Action

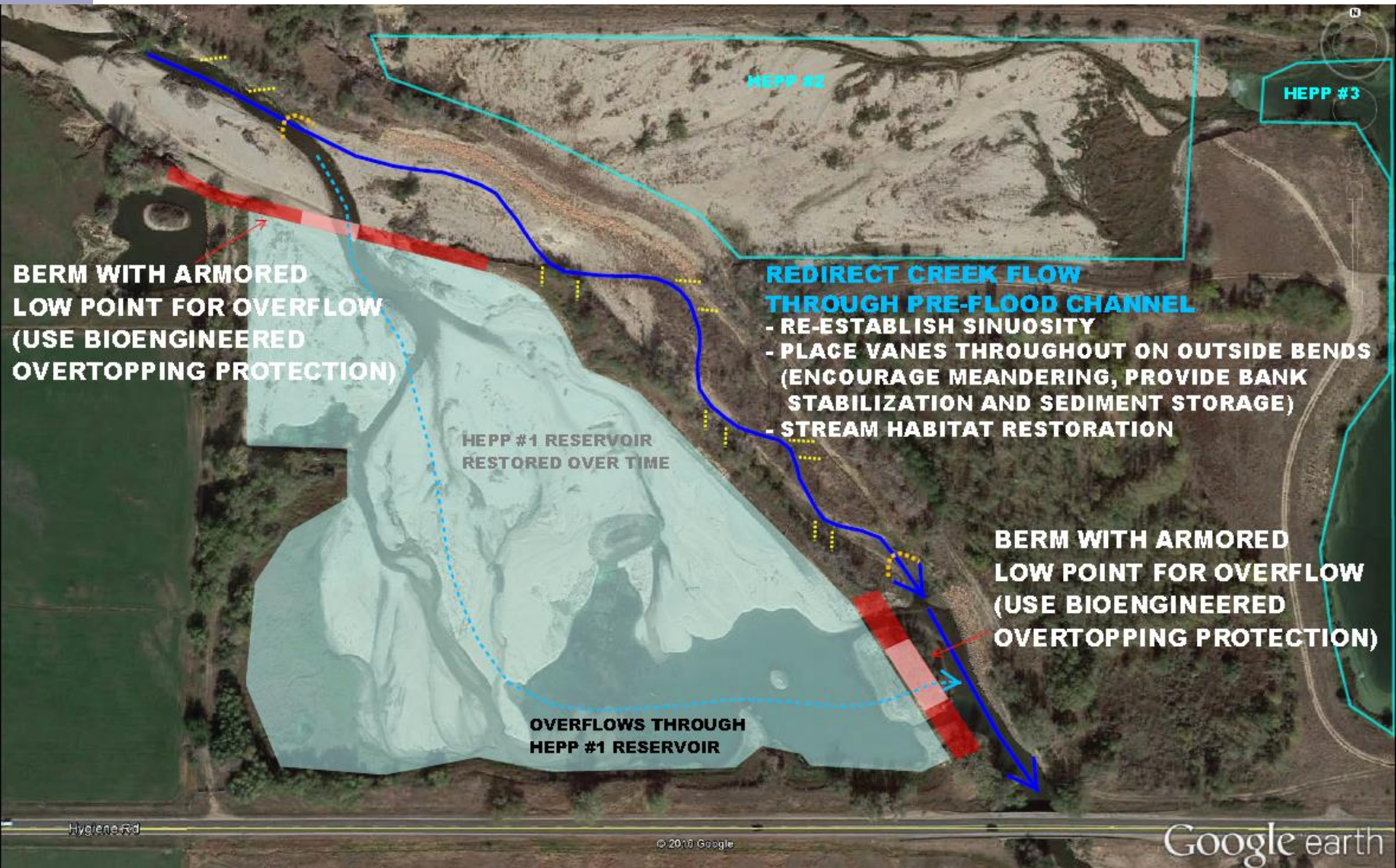
BREACHES 5,6,8,9 – Stream Reroute



BREACHES 5,6,8,9 – Overflow Berm



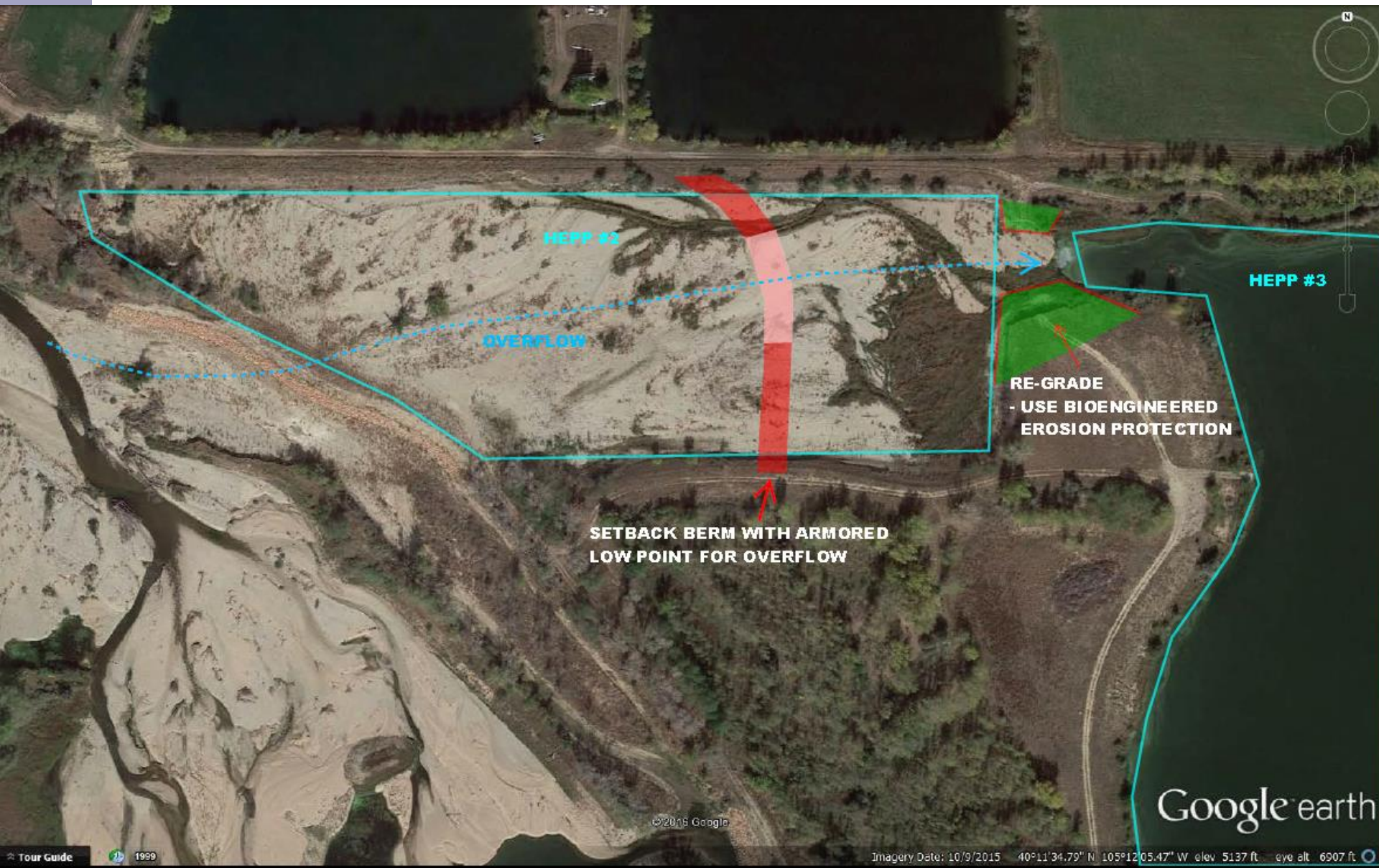
BREACHES 5,6,8,9 – Limited Backflow



BREACHES 7a/7b – No Action

BREACHES 7a/7b – Overflow Berm

BREACHES 7a/7b – Setback Berm



Thank you!

For more information, visit the project website

http://www.bouldercounty.org/os/openspace/pages/ssv-36-to-airport.aspx

or contact

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303-678-6271

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