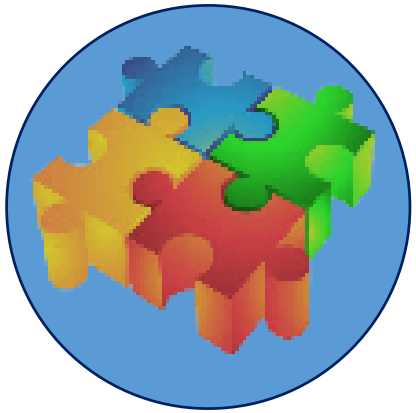
A Systems Thinking Approach to Protecting People, Property, & the Environment

2017 UDFCD Annual Seminar

David J. Skuodas, PE

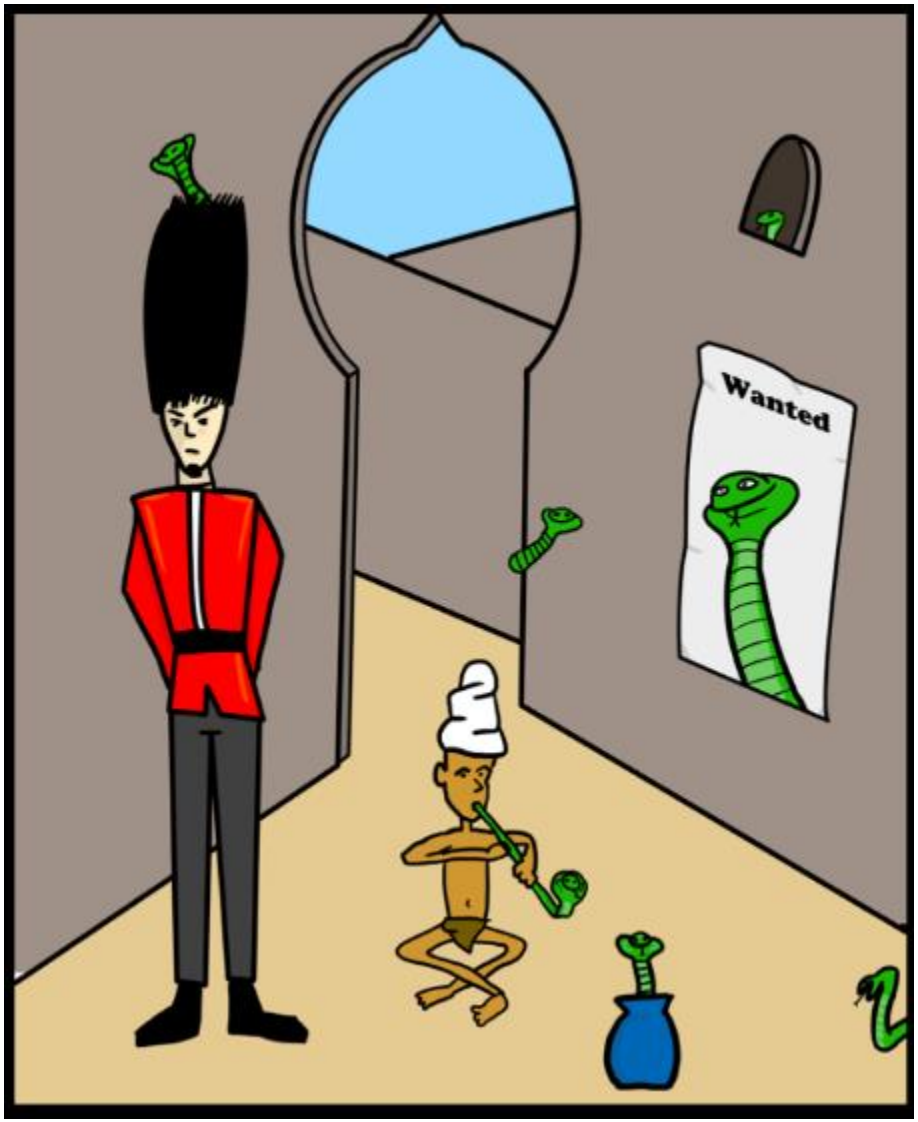
Project Manager

Stream Services



The Cobra Effect

The Cobra Effect



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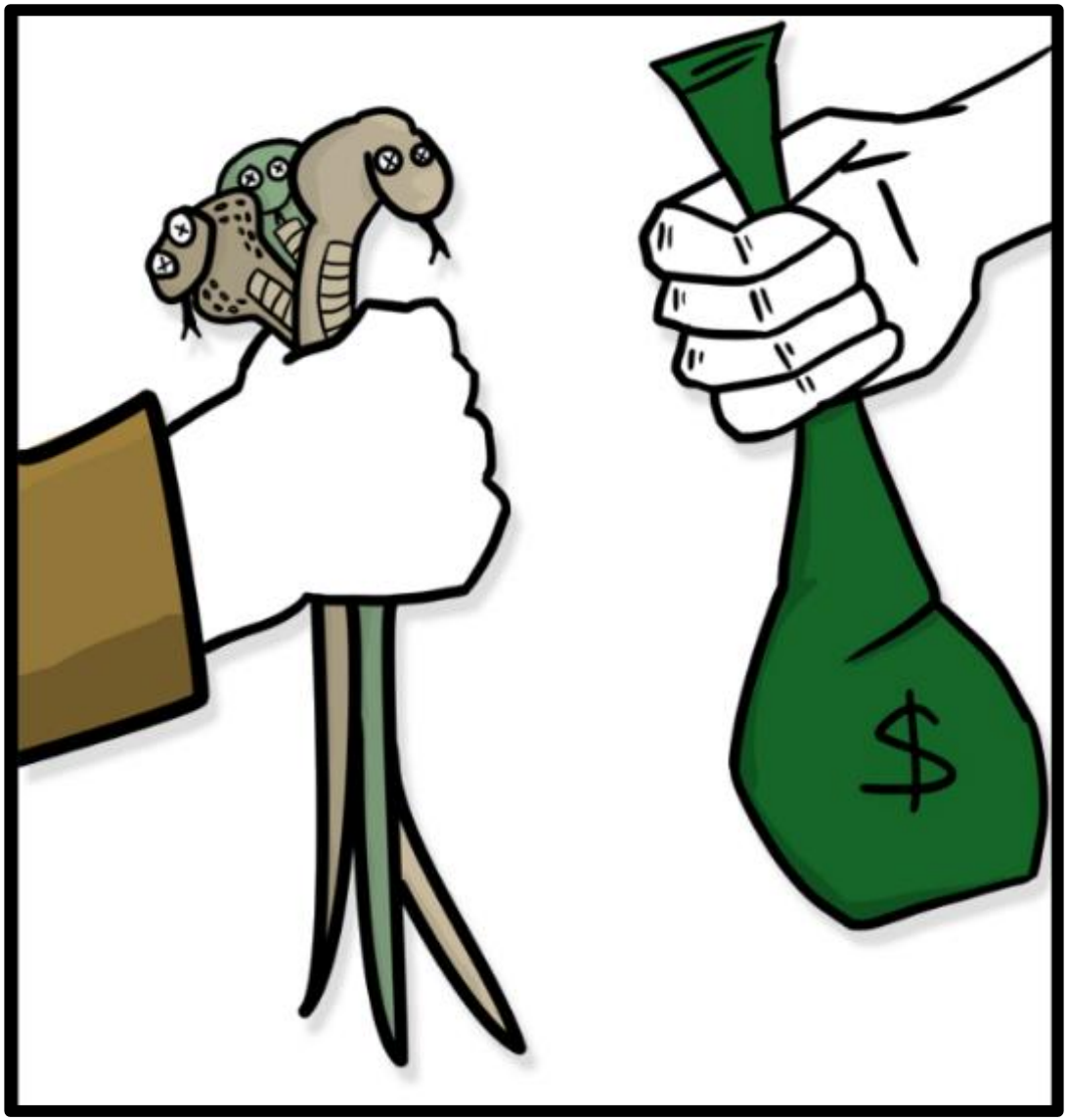

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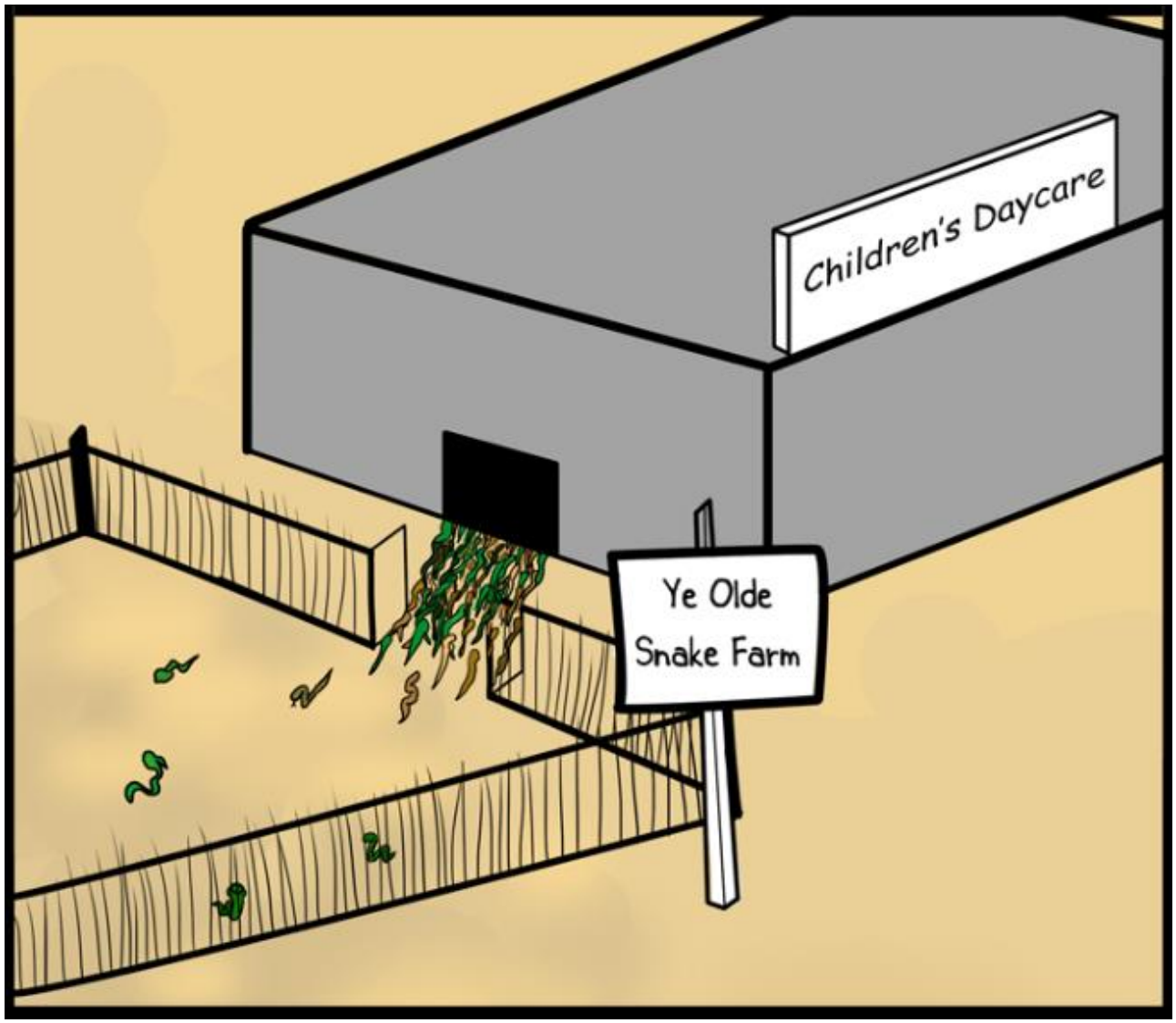

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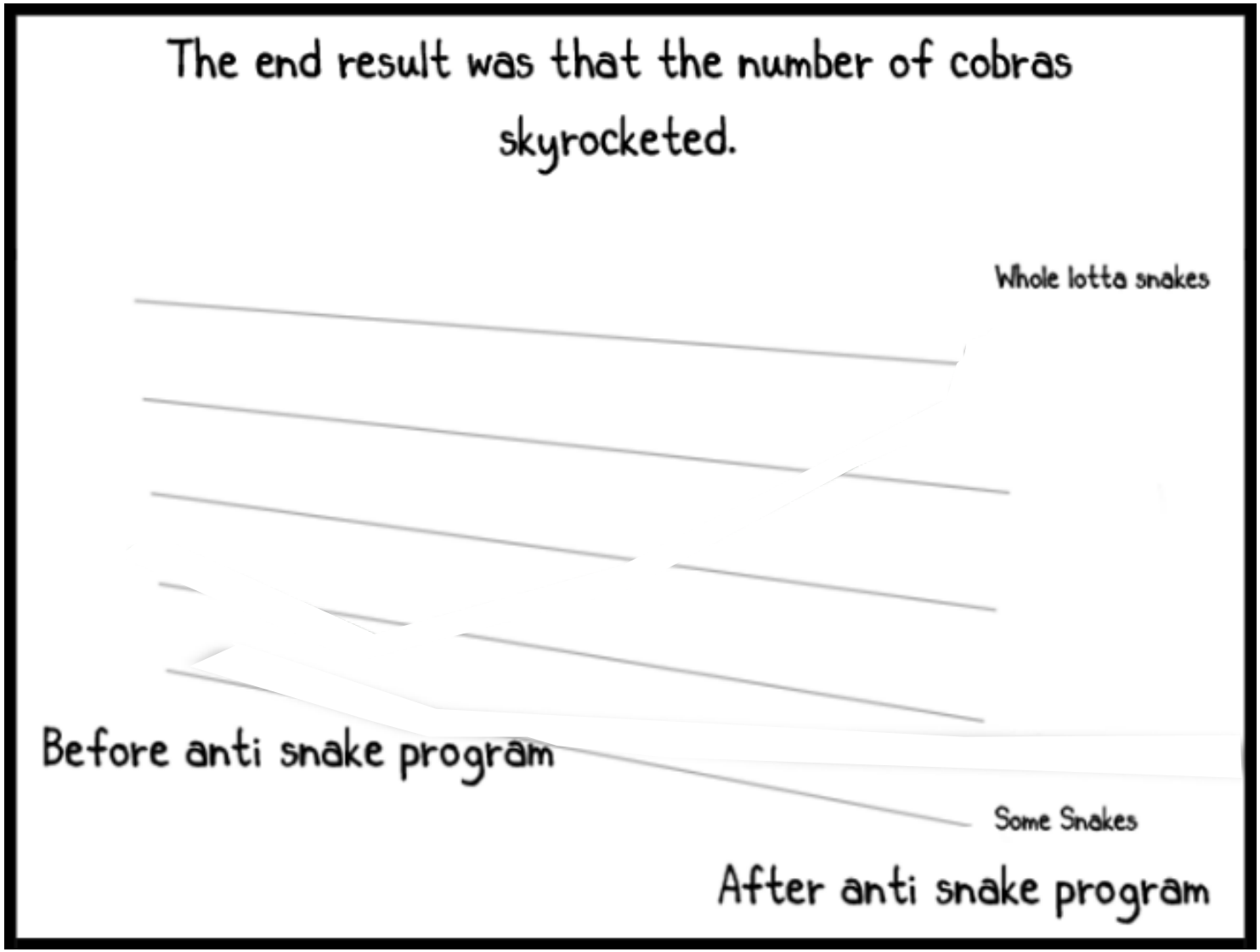



40
Corporate Dr
© 2016 Google
Google earth


1. Stormwater = Bad
(move it away as quickly & efficiently as possible)
2. Any $ from Development = Good
(regardless of long term maintenance cost)
3. Developable Land > Floodplain Preservation
(regardless of stream impacts)


REGULATIONS


ABC

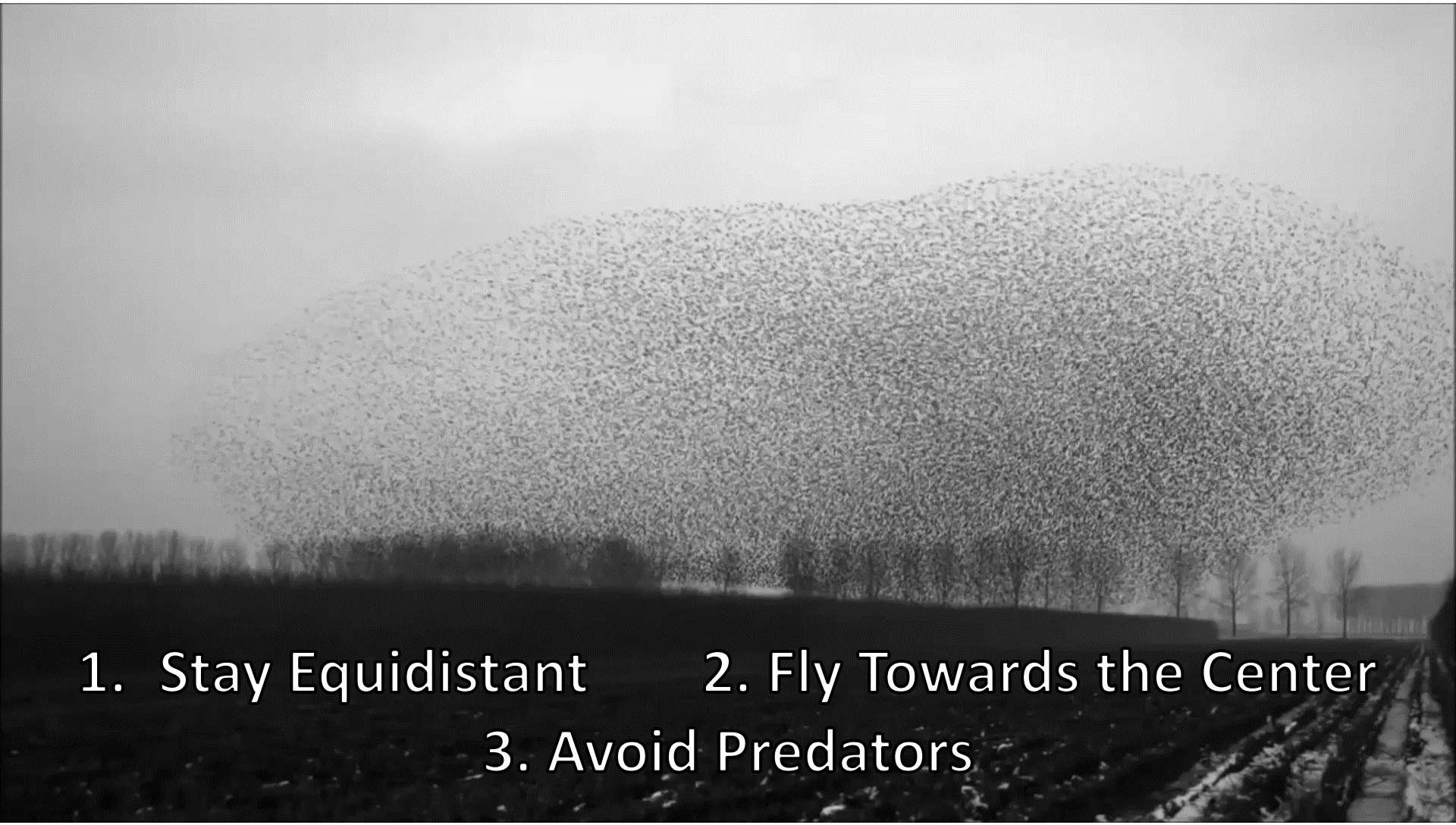
Complex Adaptive Systems

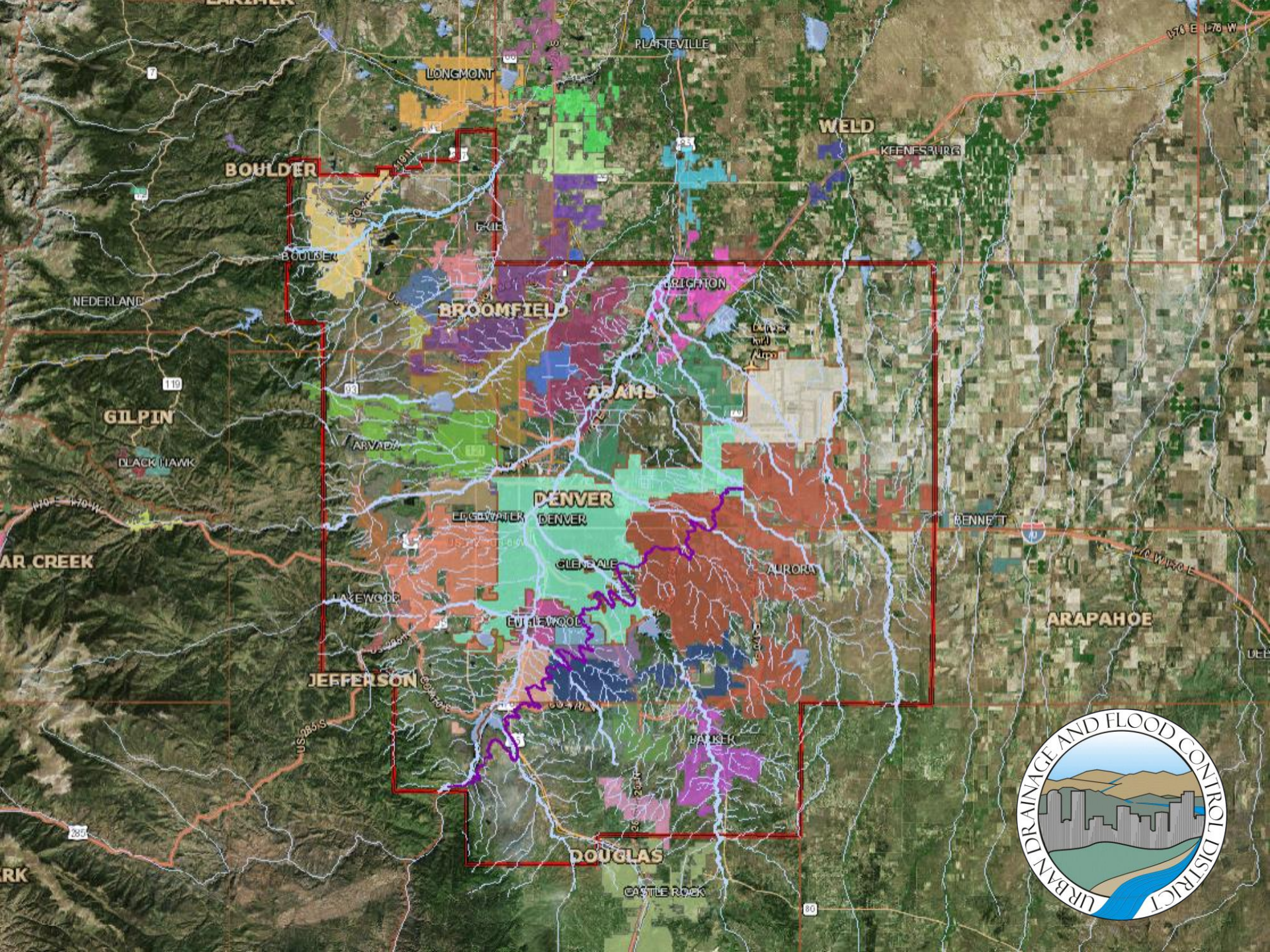
Independent Agents Operating on Simple Rules

Collective Dynamics Among the Agents Produce Global Behavior or Outcomes to Emerge

Complex Adaptive Systems

Complex Adaptive Systems




LONGMONT
PLATTEVILLE
WELD
KEENESBURG
BOULDER
NEDERLAND
BROOMFIELD
ADAMS
GILPIN
BLACK HAWK
ARVADA
DENVER
ENGLEWOOD
DENVER
CLEVEDALE
AURORA
BENNETT
LAKEWOOD
LITTLETON
ARAPAHOE
JEFFERSON
PARKER
DOUGLAS
CASTLE ROCK
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

Systems Thinking

Systems thinking is a vantage point from which you see a whole, a web of relationships & interconnectedness, rather than focusing only on the specific detail of any particular piece.

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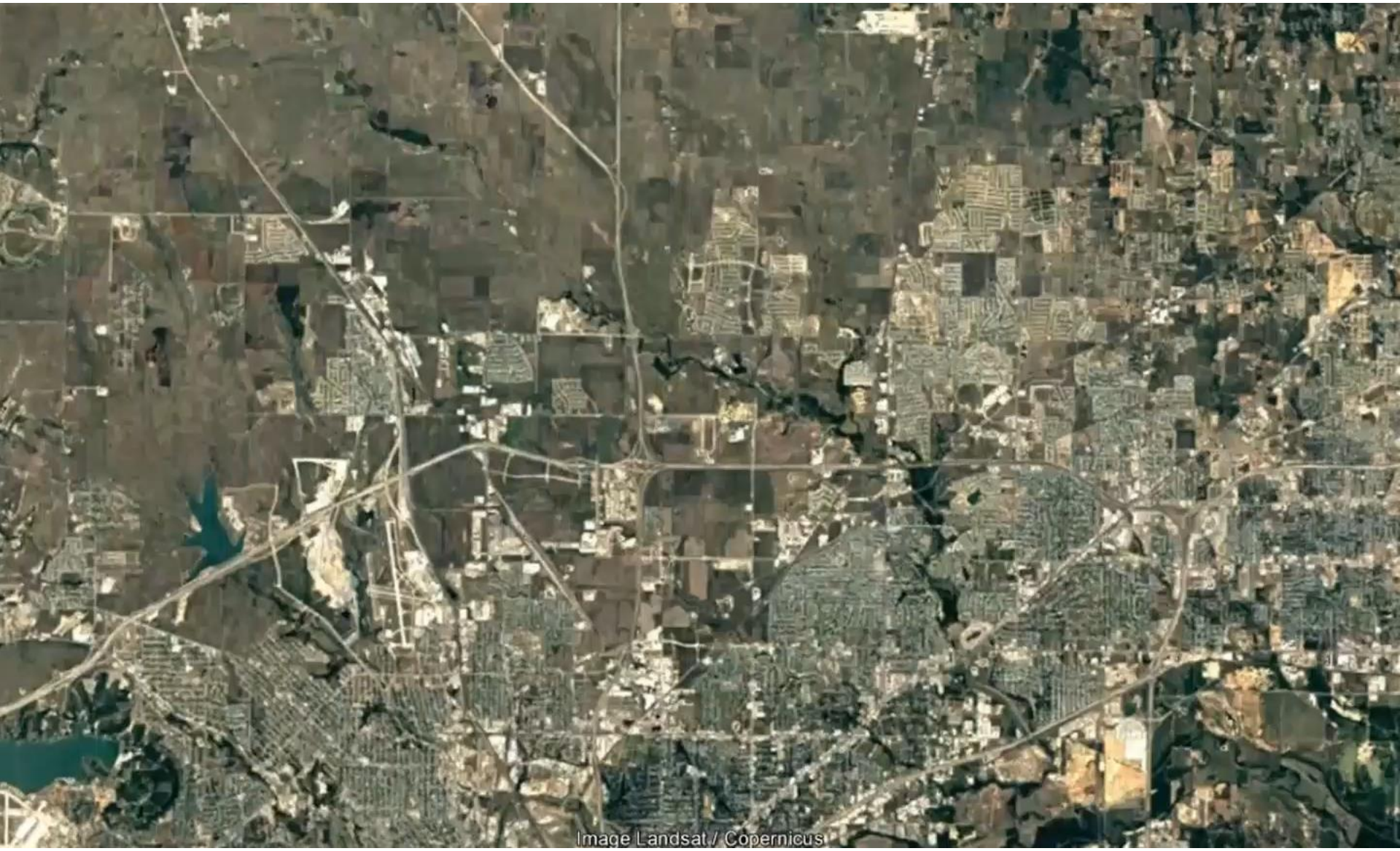
Events are seen in the larger context of a pattern that is unfolding over time.

Systems Thinking




Think Beyond Our Project Location
Time & $$$ Efficiency
Image Landsat / Copernicus
Google earth
Think Beyond Flood Control
Stream Optimization
Think Beyond Our Point in Time
Financial Sustainability


Think Beyond Our
Project Location
Image Landsat / Copernicus
Google earth

Insect “A”

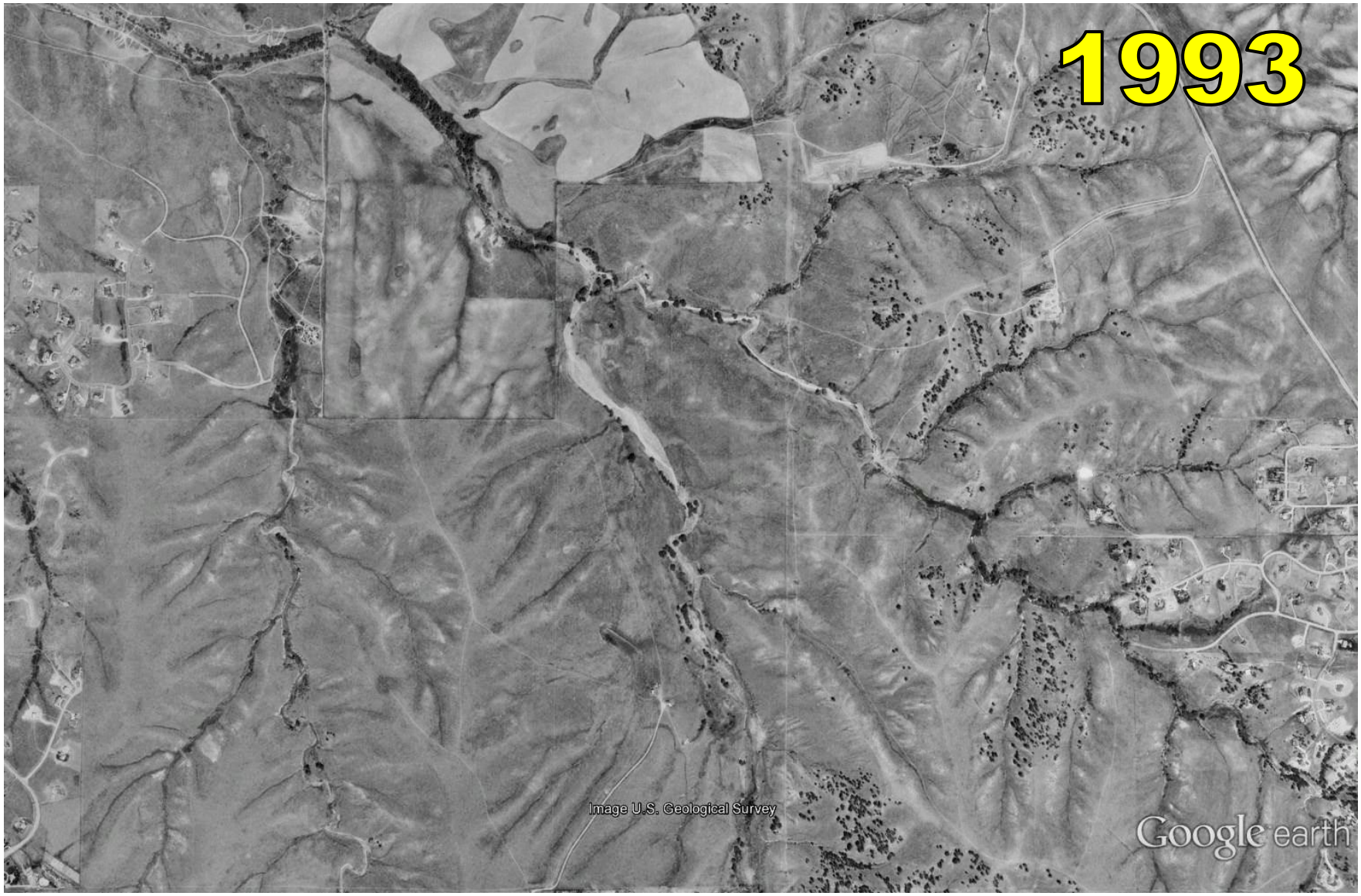

More Pesticide =
Less Insects =
Higher Crop Yield

Insect “A”


ROUND 1
Insect “A”
Insect “B”
(c)2006 Jules & photoshoppix.com

Piney Creek Sediment Issues

Piney Creek Sediment Issues



Piney Creek Sediment Issues

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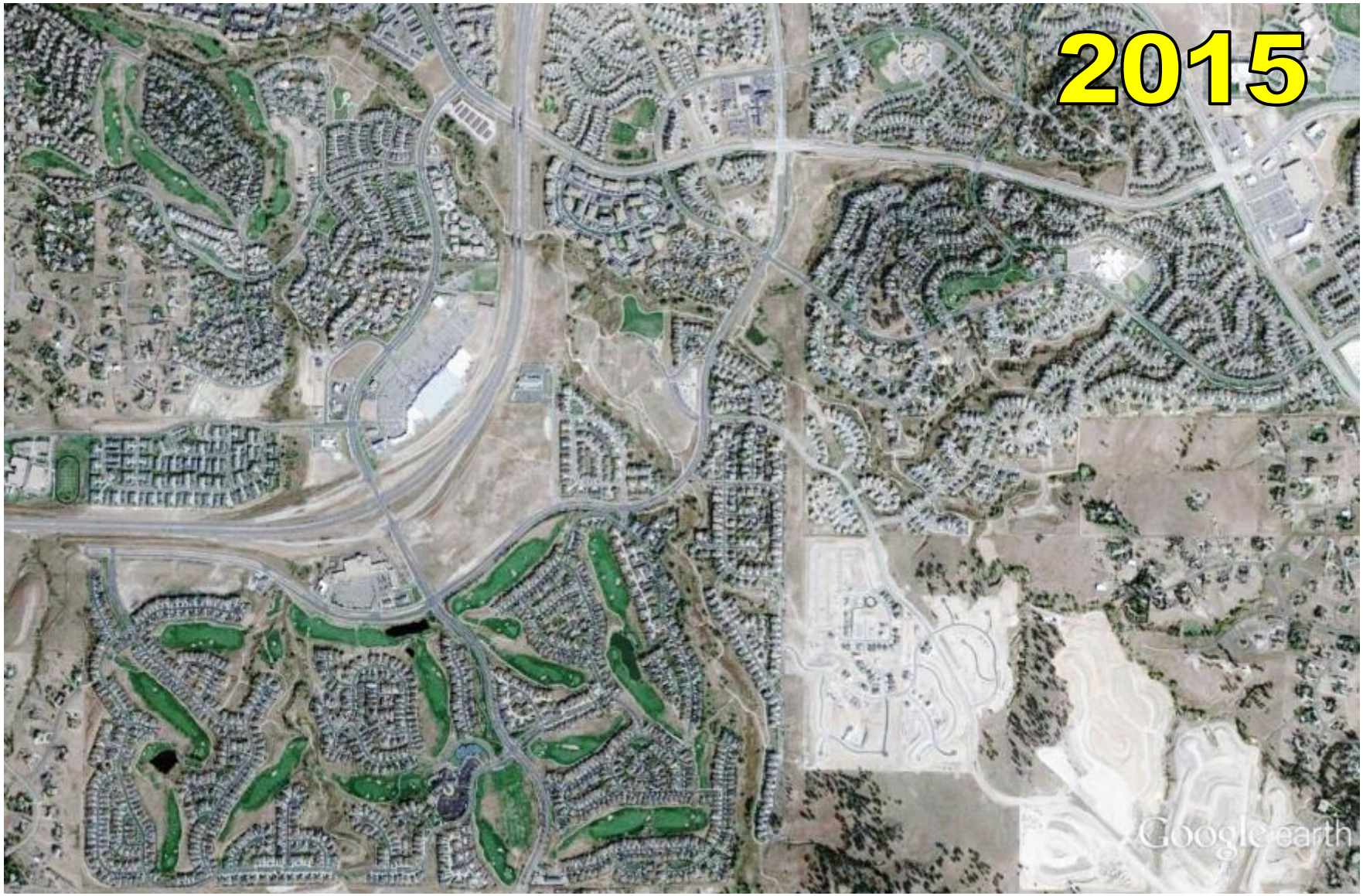
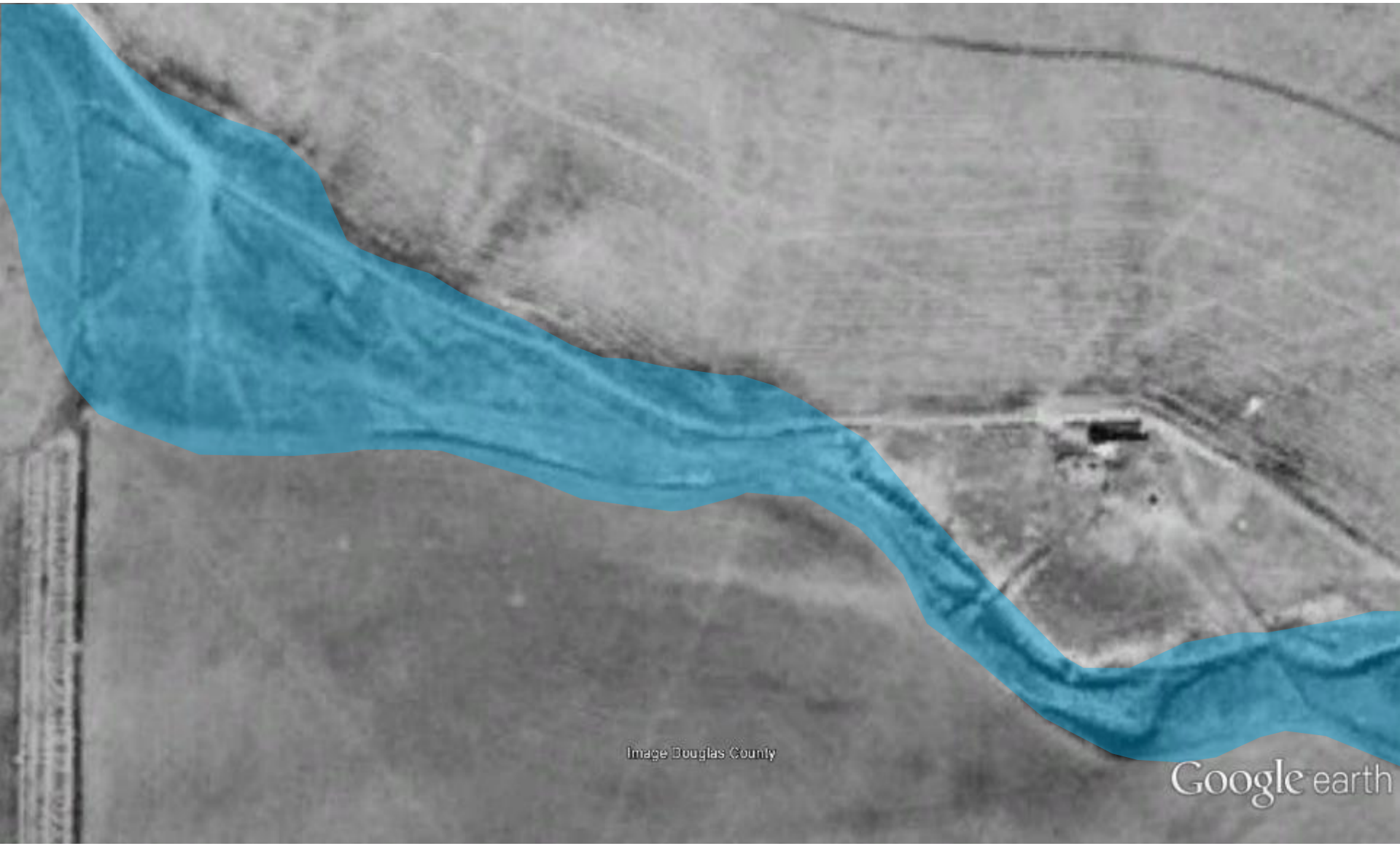


Developer Driven Projects



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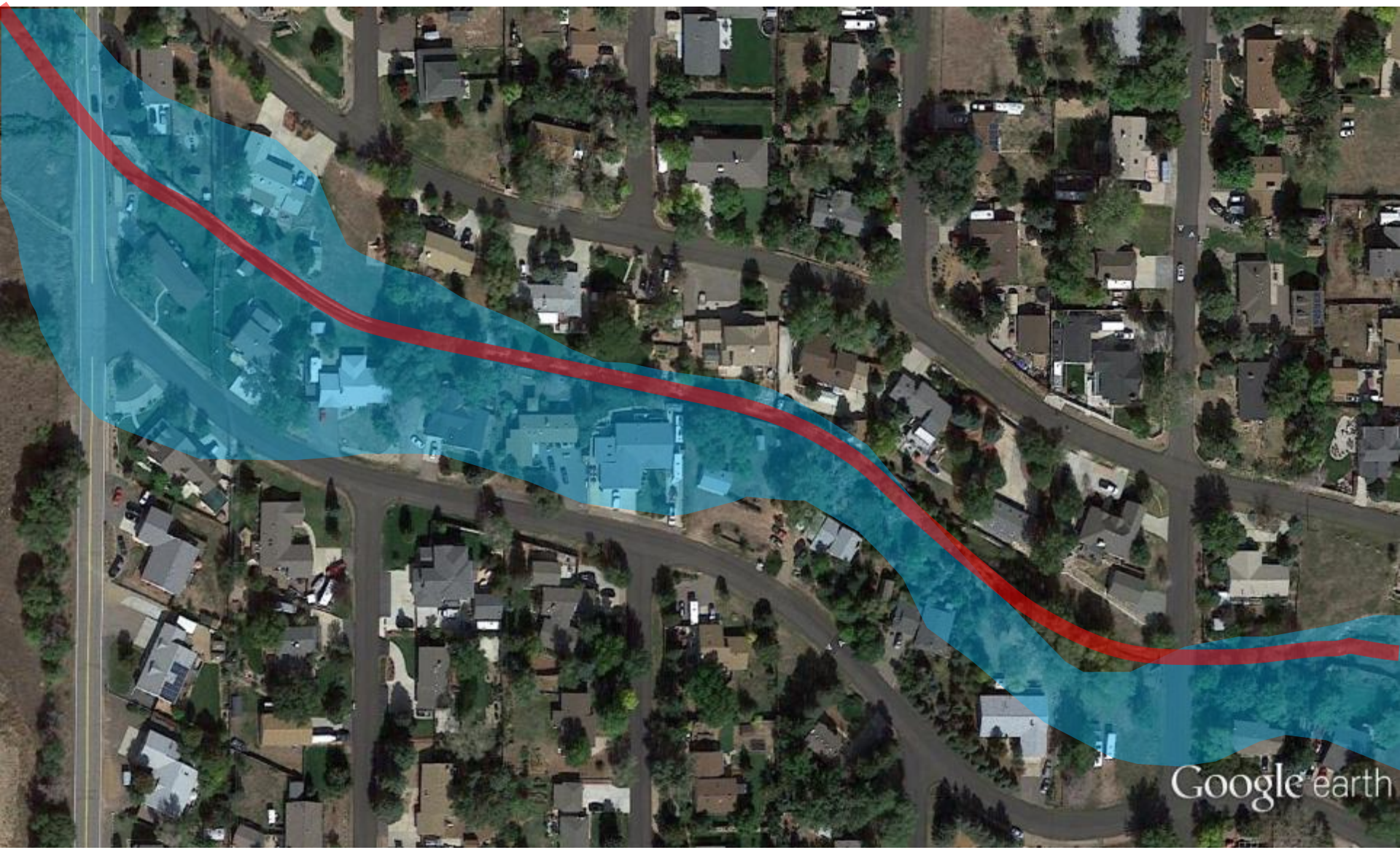

Developer Driven Projects

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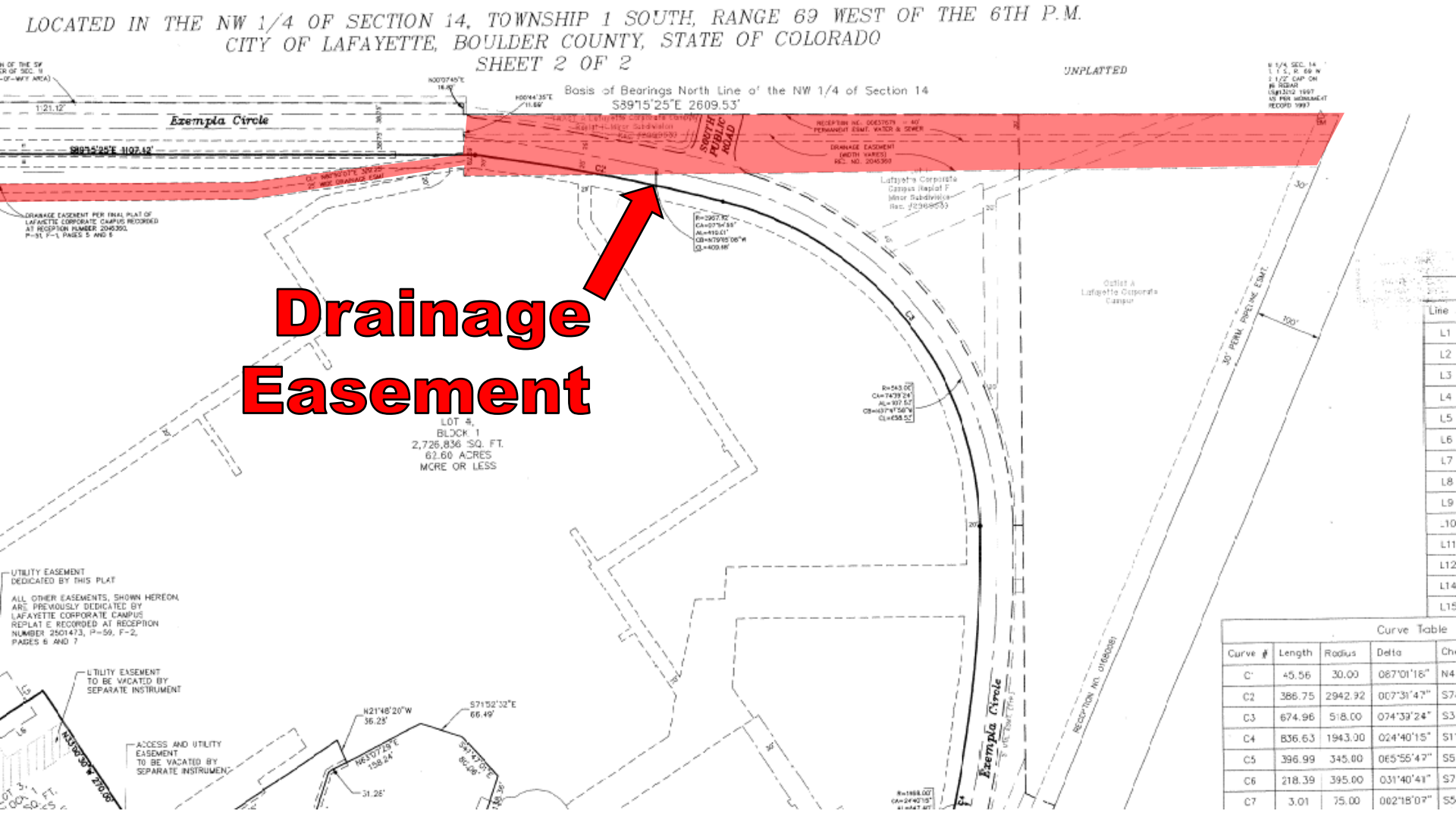


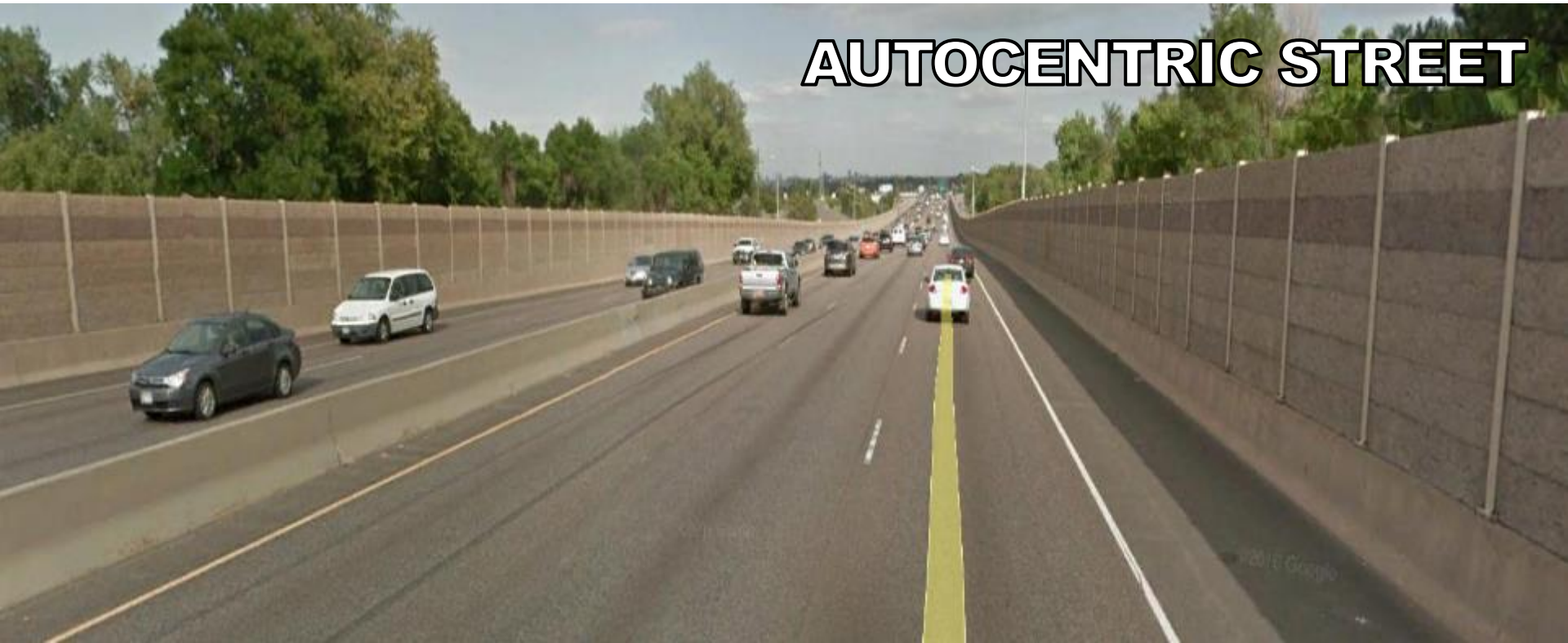
Developer Driven Projects


Think Beyond
Flood Control


AUTOCENTRIC STREET


COMPLETE STREET
1
2
3
4
5
6


FLOODCENTRIC STREAM


AUTOCENTRIC STREET


FLOODCENTRIC STREAM

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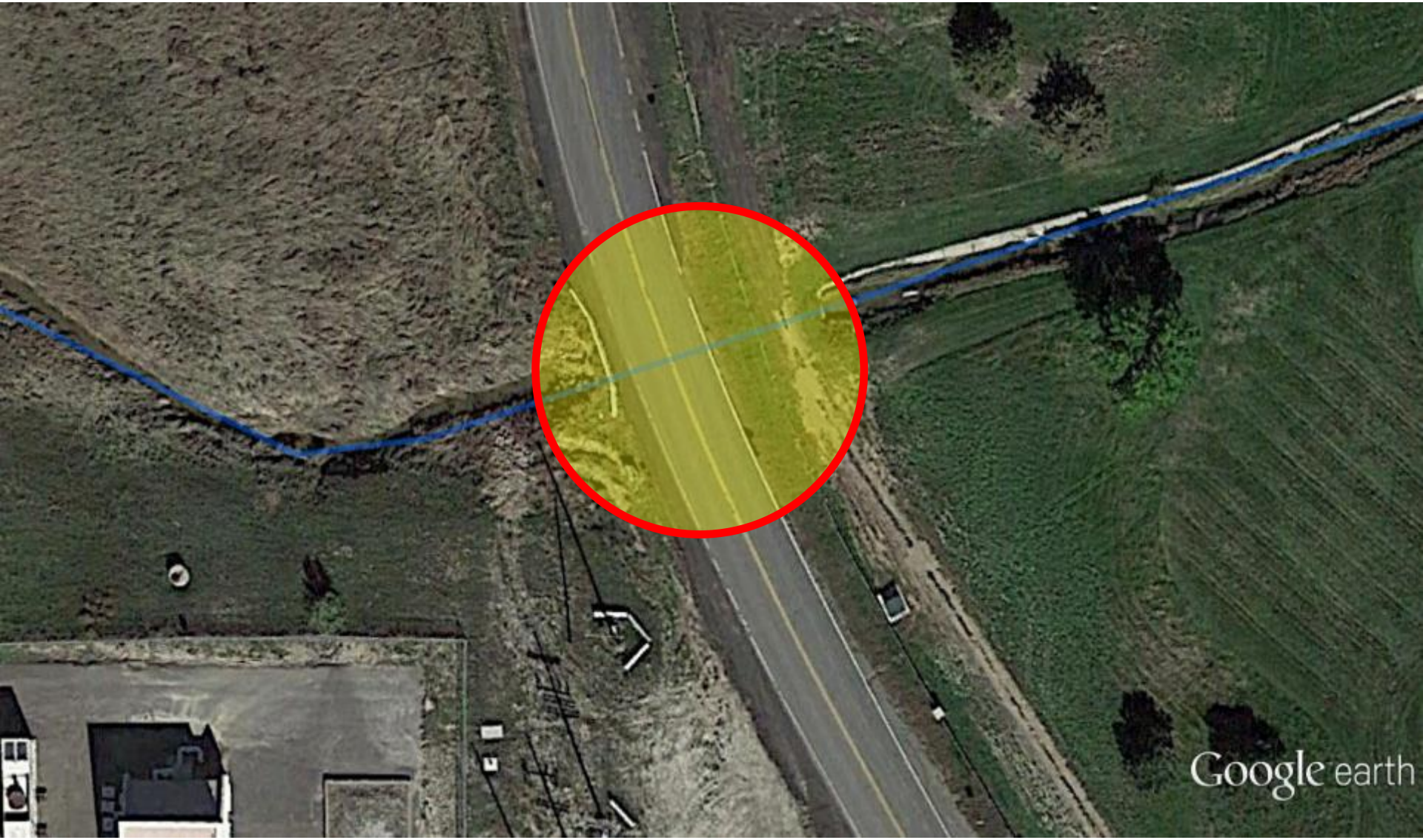
Brantner Gulch at Riverdale Road



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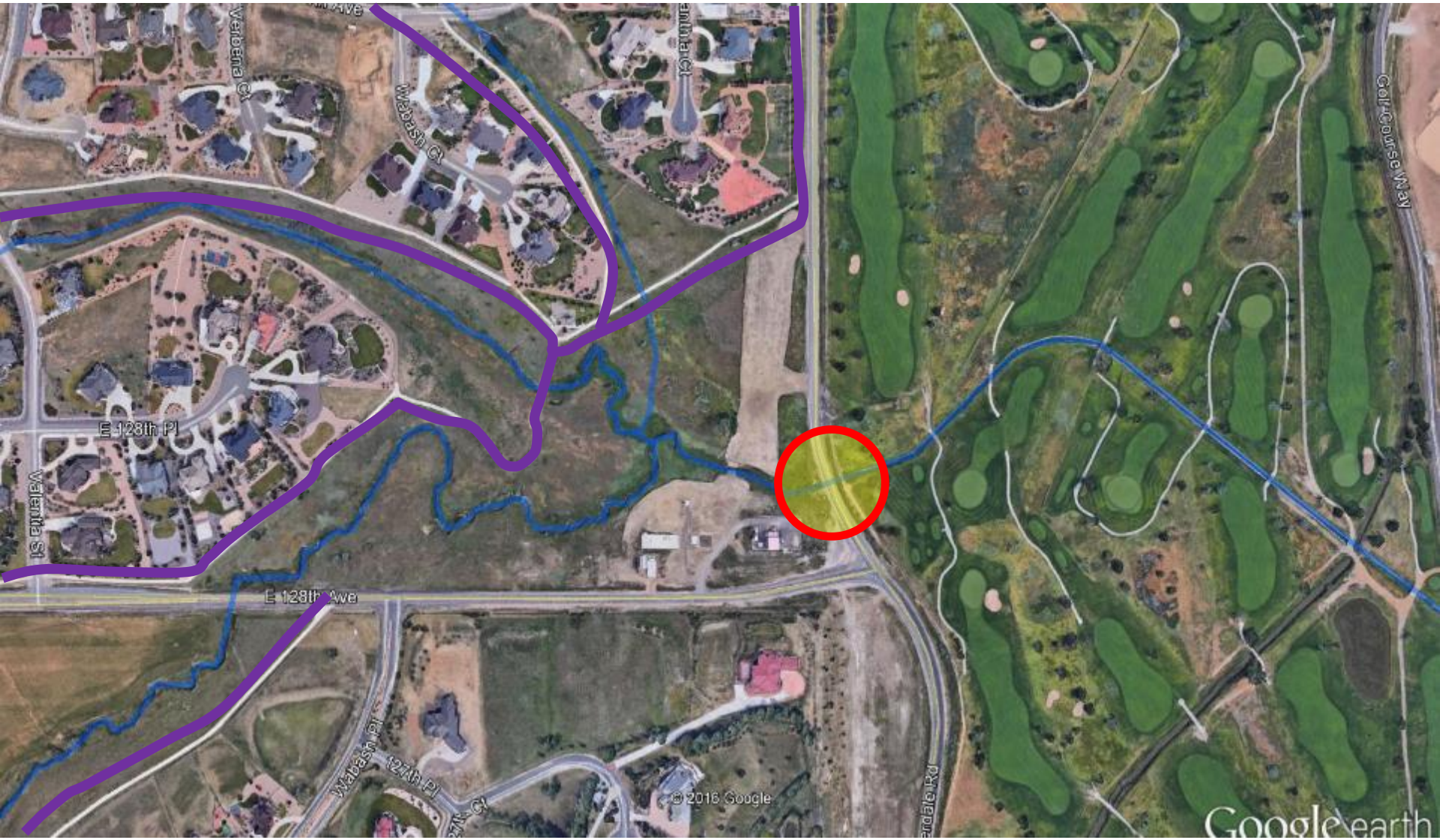

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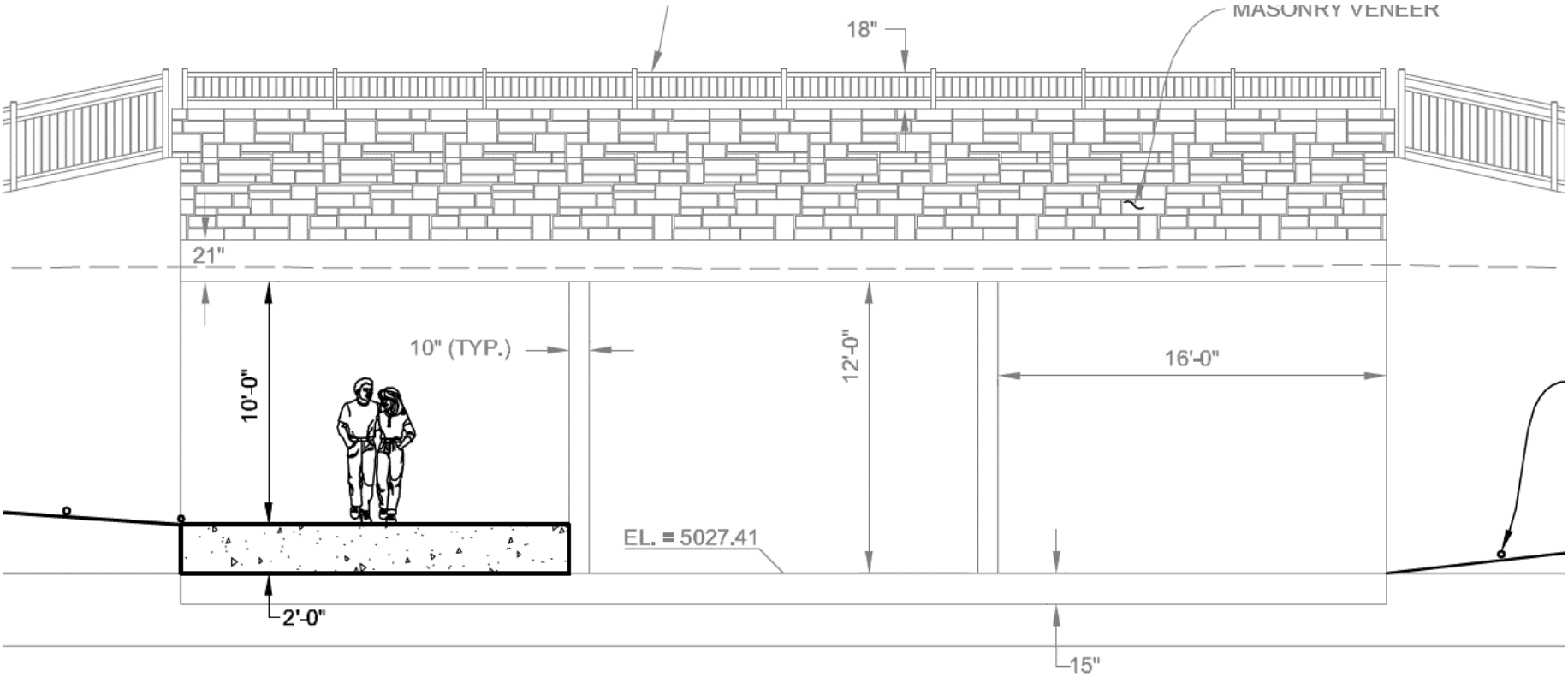
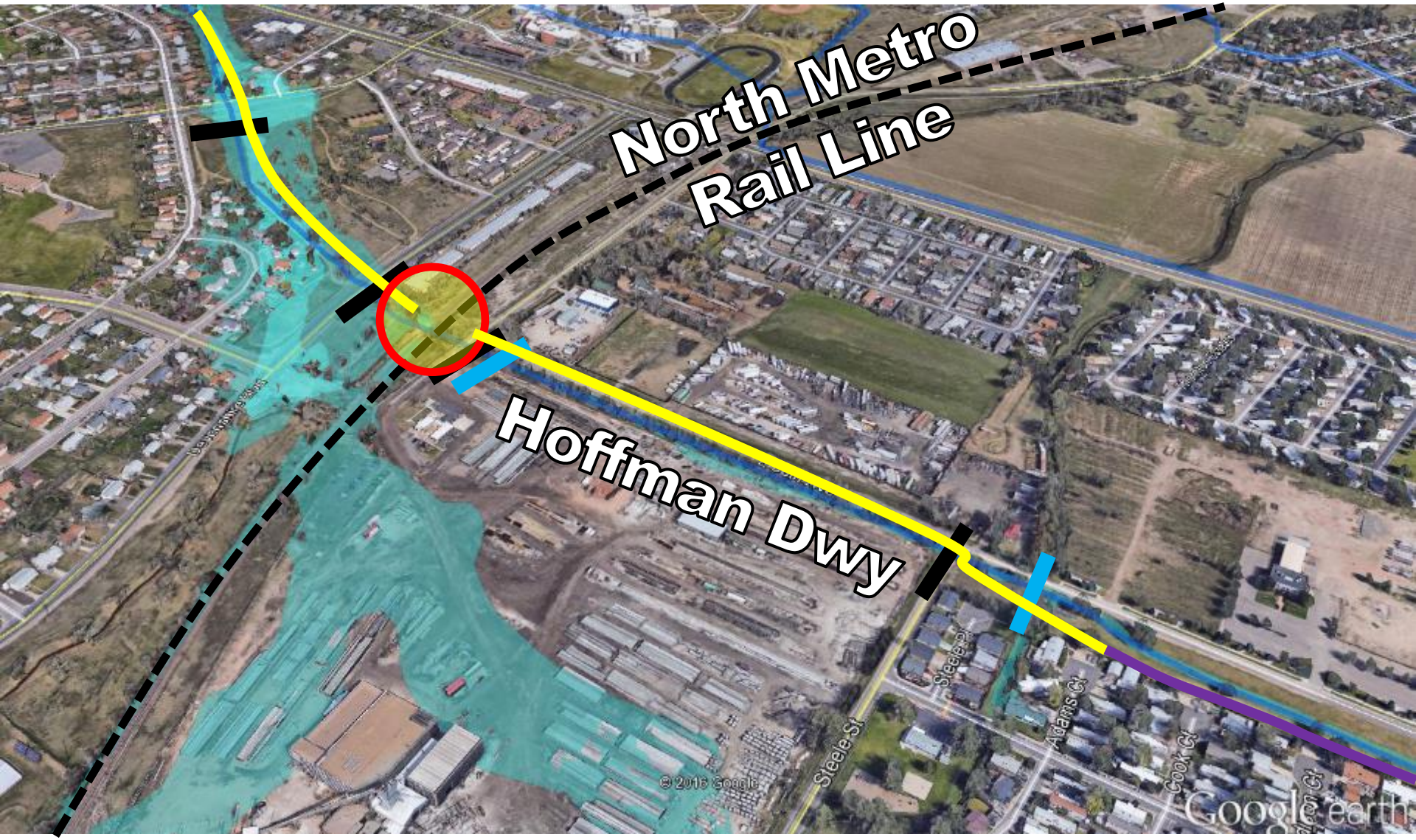


CCOUNT FOR UP TO
THE NORTH OR
E OF CONSTRUCTING
VN).

S IS NOT INCLUDED

WEST (UPSTREAM) FACE PROFILE
SCALE: 1" = 5'-0"

Hoffman Drainageway



Hoffman Drainageway

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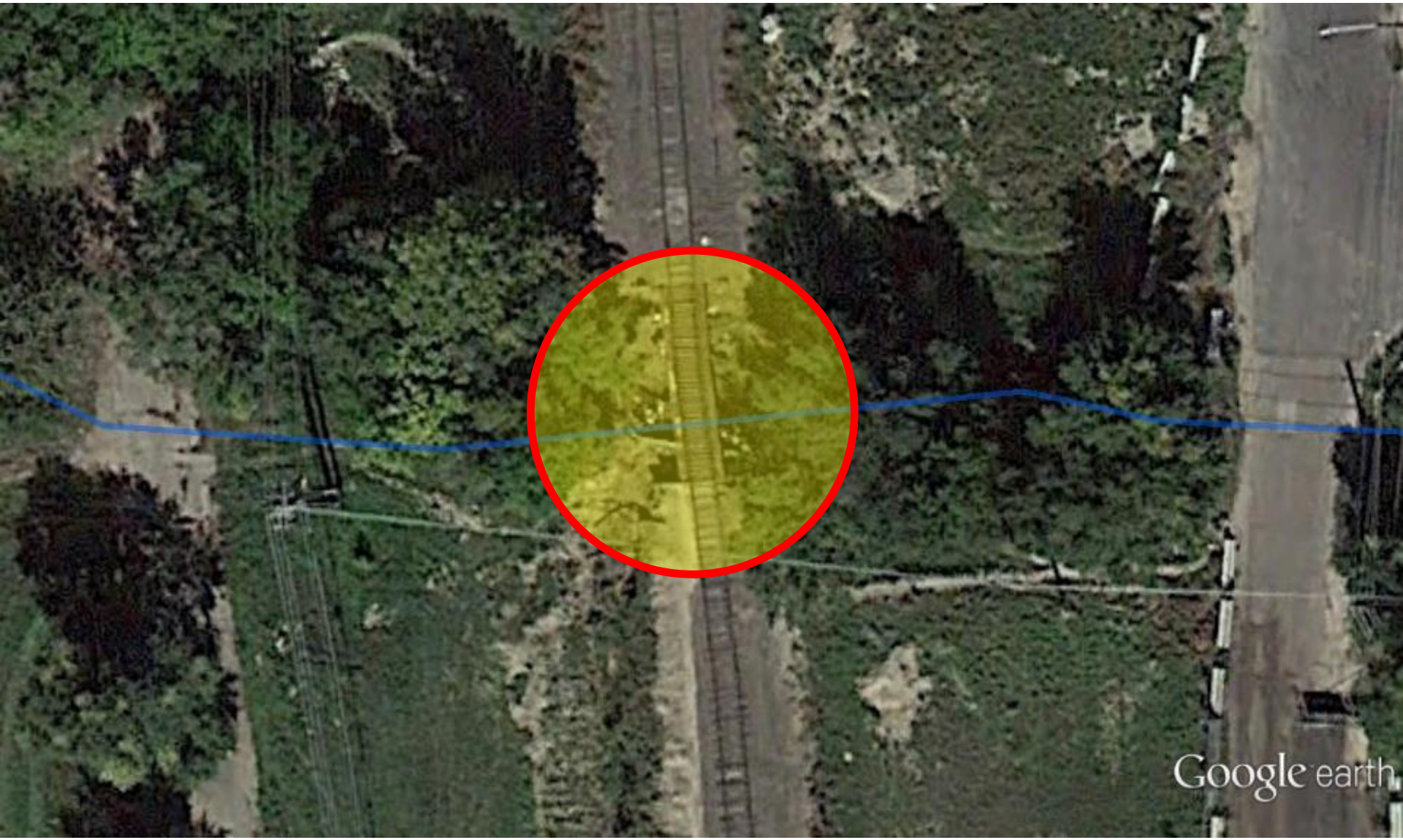


Hoffman Drainageway

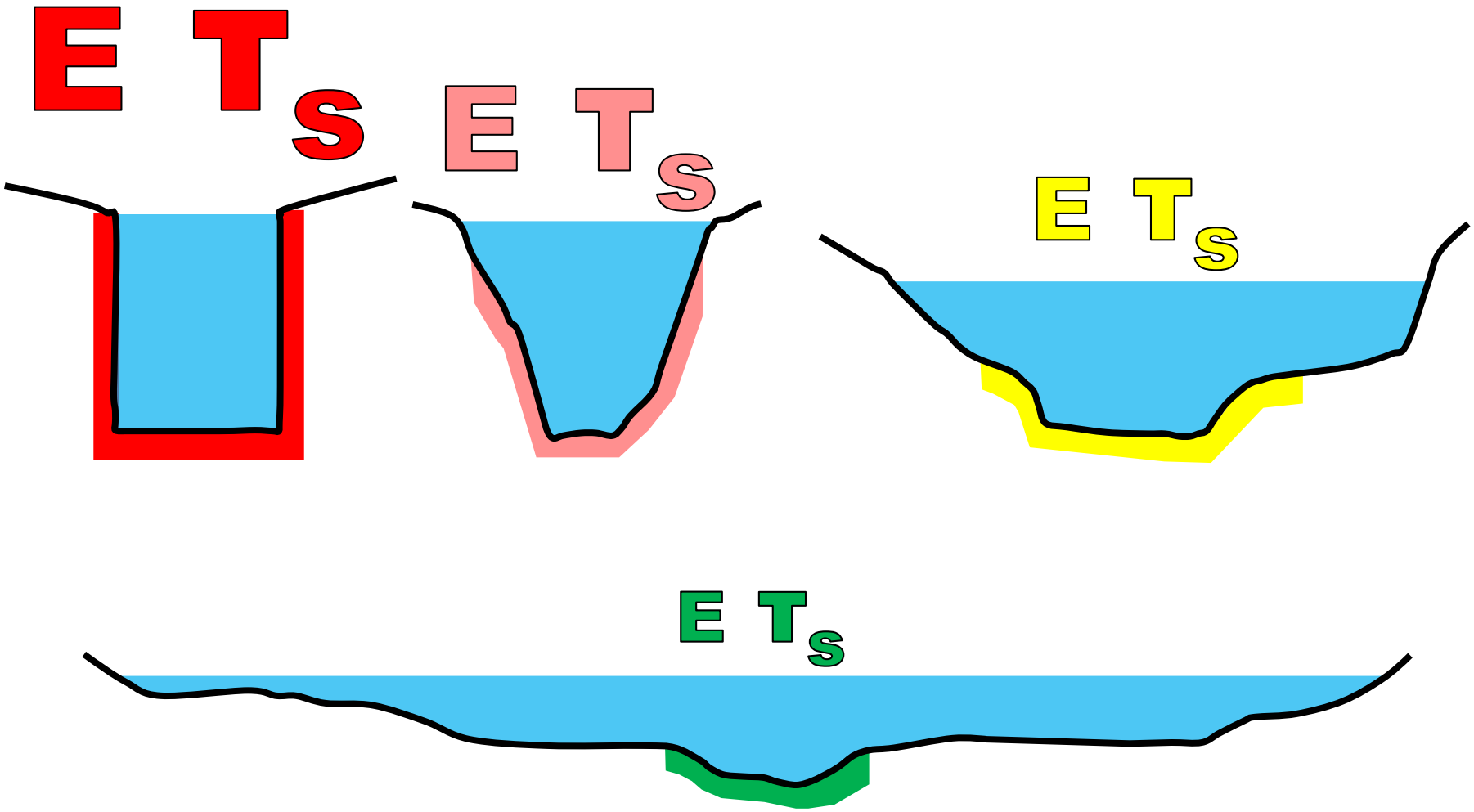
Hoffman Drainageway


Think
Beyond Our
Point in Time

Think Beyond Our Point in Time

Think Beyond Our Point in Time

Natural Floodplain Preservation

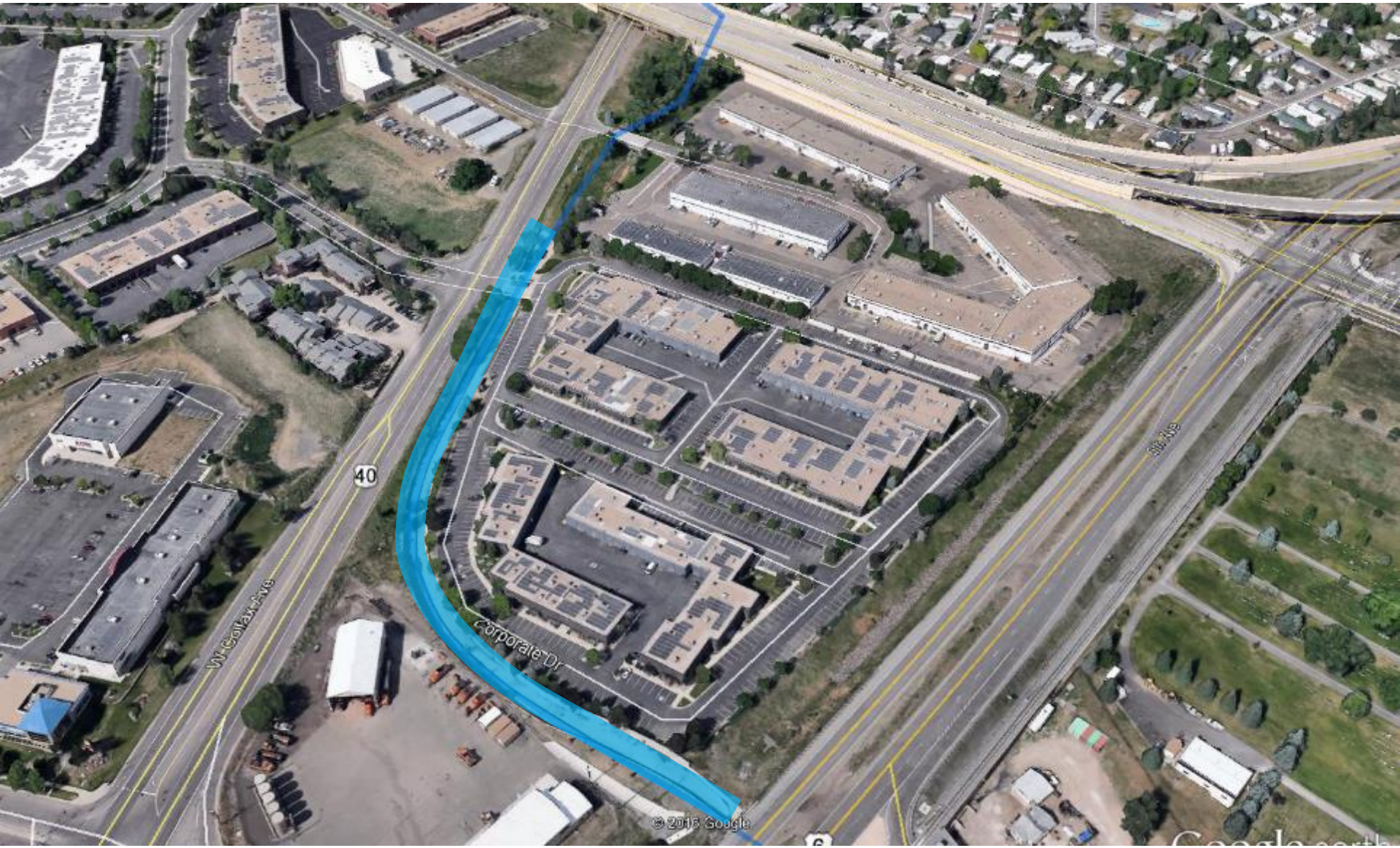


Natural Floodplain Preservation

Think Beyond Our Point in Time

Lena Gulch

Lena Gulch



Lena Gulch

UDFCD Funding

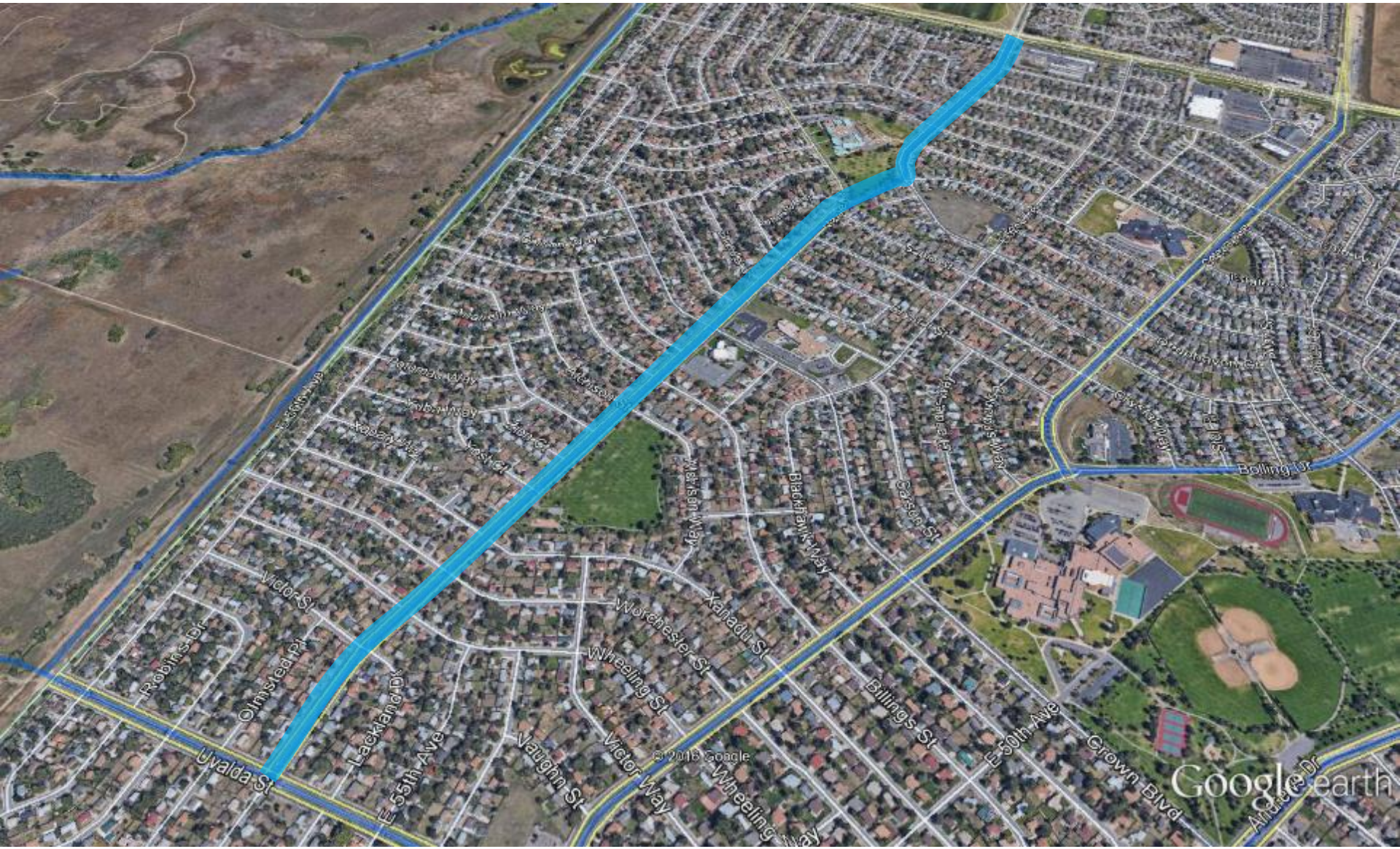
Total $268/yr

Maintenance $97/yr

Lena Gulch

Maxwell Tributary

Maxwell Tributary



Maxwell Tributary

Maxwell Tributary

Maxwell Tributary

Newlin Gulch

Newlin Gulch

Newlin Gulch

Newlin Gulch

Newlin Gulch

Rock Creek

Rock Creek

Rock Creek


Autrey Reservoir
Hodgson-Harris Reservo
Eagle Ave
Denver Boulder Turnpike
36
© 2018 Google
Google earth

Rock Creek

UDFCD Funding

Total $7,460/yr

Maintenance $2,685/yr

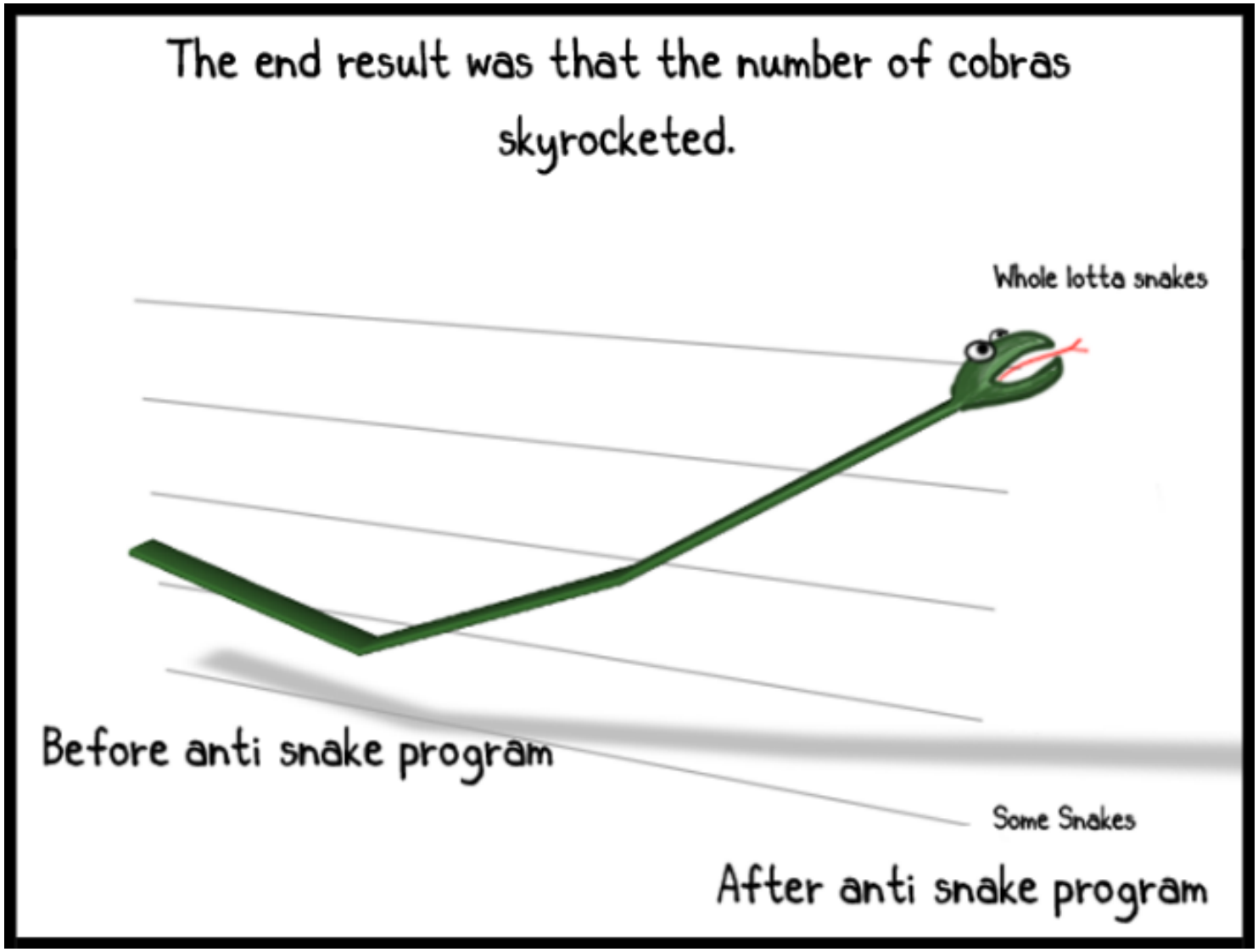
Rock Creek

Rock Creek

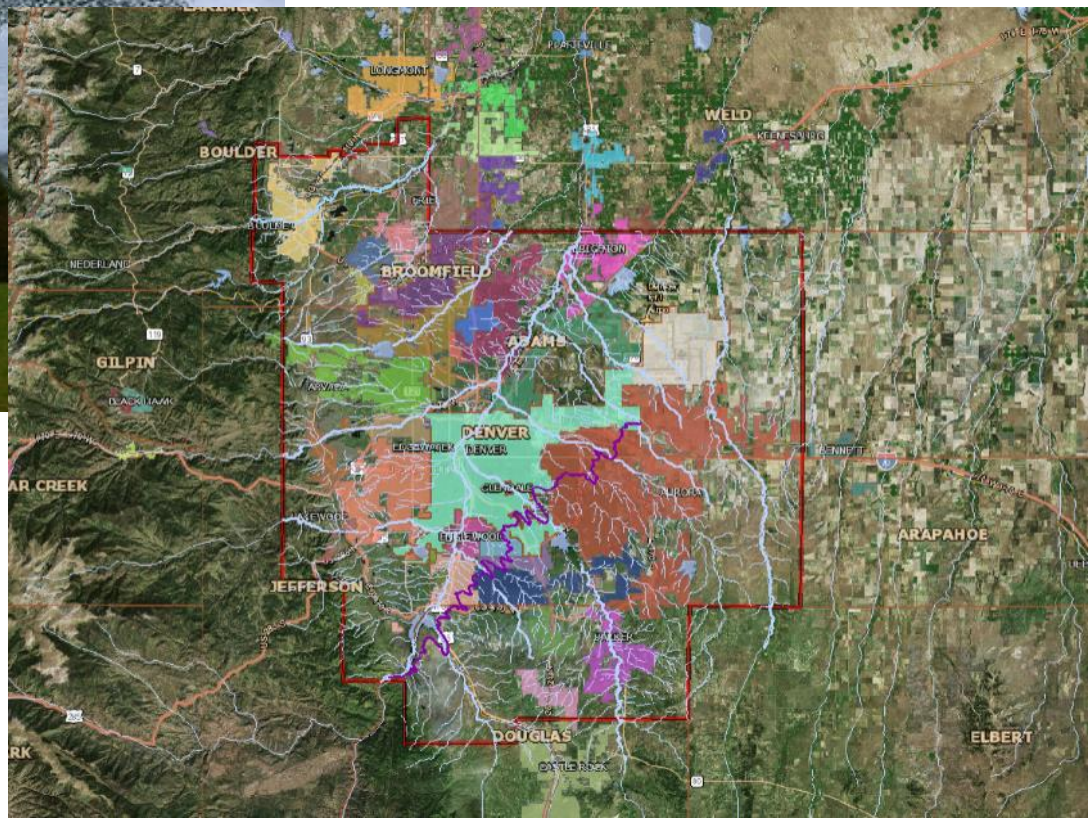
~~200 YEARS~~
70 YEARS

Natural Floodplain Preservation

Find Unintended Consequences



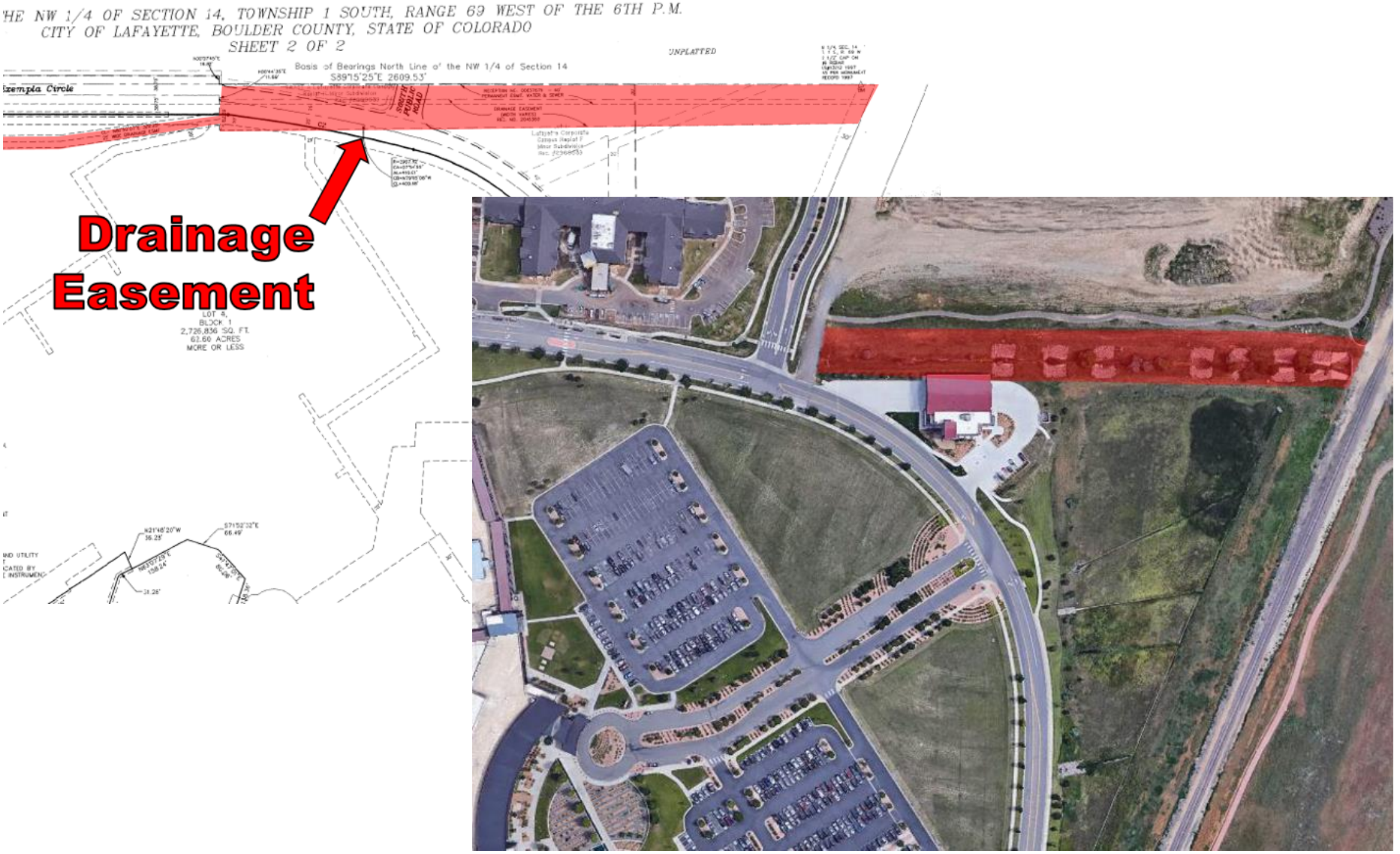
Recognize System Structure



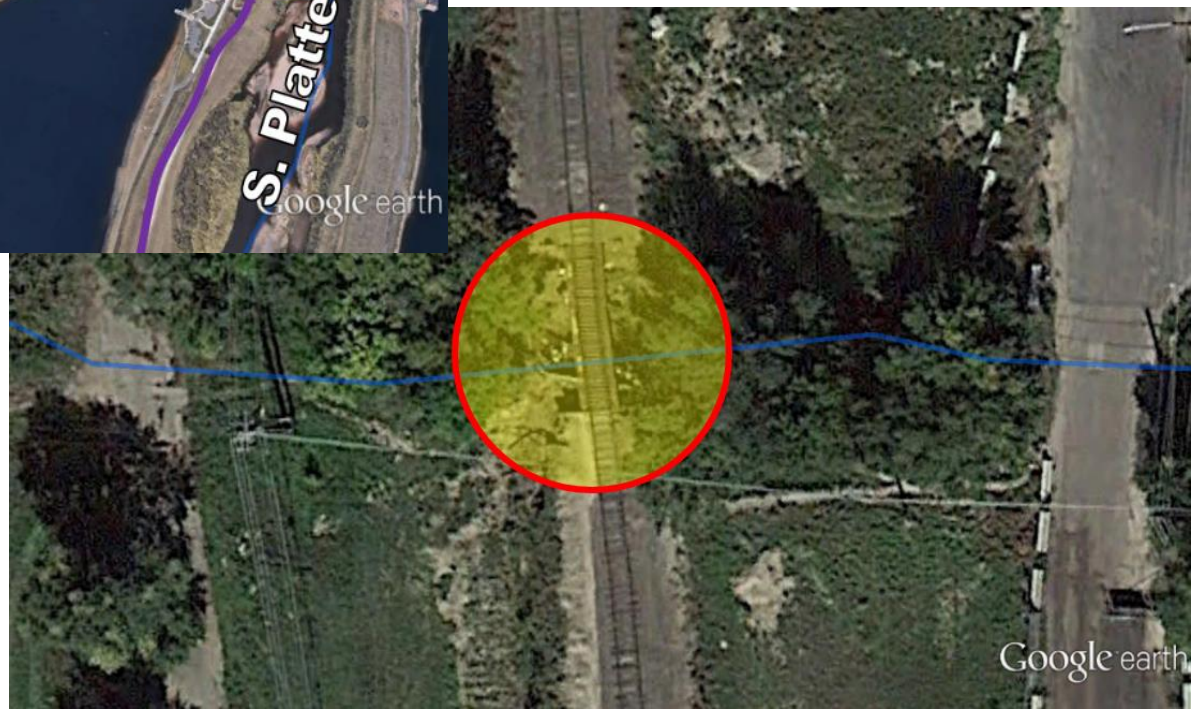
Investigate Cause and Effect

Change Perspective

Look for Leverage



Seek to Understand the Big Picture



Use Feedback and Adjust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