Waldo Intercounty Drain

Hearing of Necessity

Larkin Township Hall

June 17, 2019

10:00 A.M.

Agenda

- Background information on drain
- Drainage district review
- Engineering review
- Recommendations and estimate of cost for improvements

Drain Background

- Existing Drain
  - 20 miles of open drain
  - Includes:
    - Main Branch
    - Branches No. 1 through No. 7
    - Bennett Drain, Ott Drain, Beckman Drain
  - 130 existing crossings
  - Watershed area of 26,672 acres

Drain Background

- Previous Projects
  - Waldo Drain – Established in 1905
  - Ott Drain – Established in 1913
  - Beckman Drain – Established in 1914
  - Waldo Drain Petition Project in 1917
  - Waldo Drain Petition Project in 1974

Drain Background

- March 16, 2018 - Petition filed with Midland County Drain Commissioner

- May 17, 2018 –Hearing of Practicability
  - Determined to move forward with preliminary engineering study
  - Testimony of Poor Drainage and Flooding

Drainage District

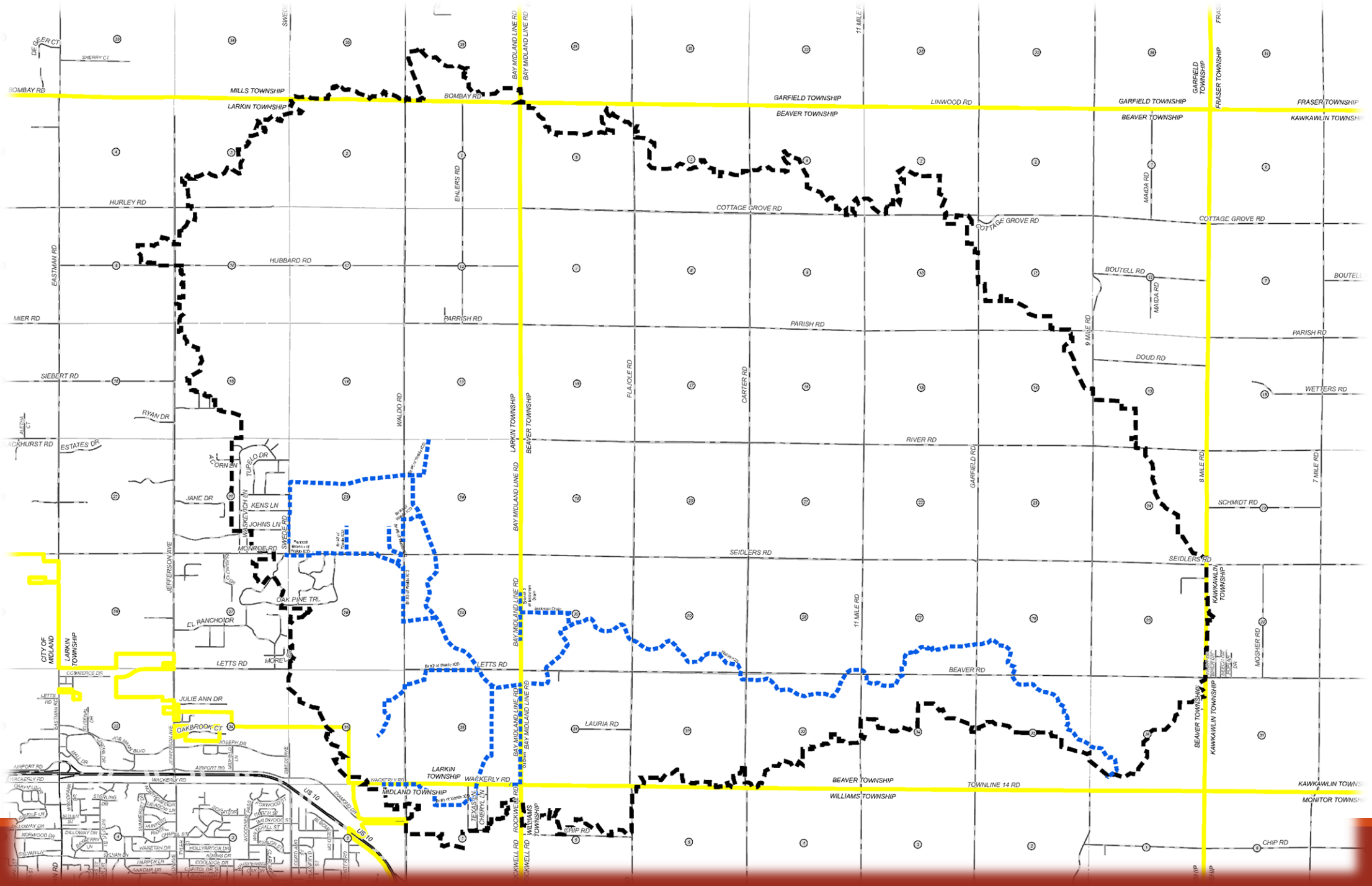
- What is a drainage district?
  - Lands that contribute storm water to the drain
  - Lands special assessed for improvements
  - Drainage district includes:
    - County and township government
      - Bay County: Beaver Twp, Williams Twp, Kawkawlin Twp
      - Midland County County: Larkin Twp, Midland Twp, Mills Twp, City of Midland
    - Landowners (Approximately 2,200 parcels)
      - Bay County – 1156 Parcels
      - Midland County – 1011 Parcels

Drainage District

- How is drainage district determined?
  - Identify lands that drain towards the county drain
    - Directly or indirectly connected to drain
    - Based on surface water flow
  - Reviewed existing maps and aerial photos
  - Reviewed available contour maps
  - Field reviewed district boundary

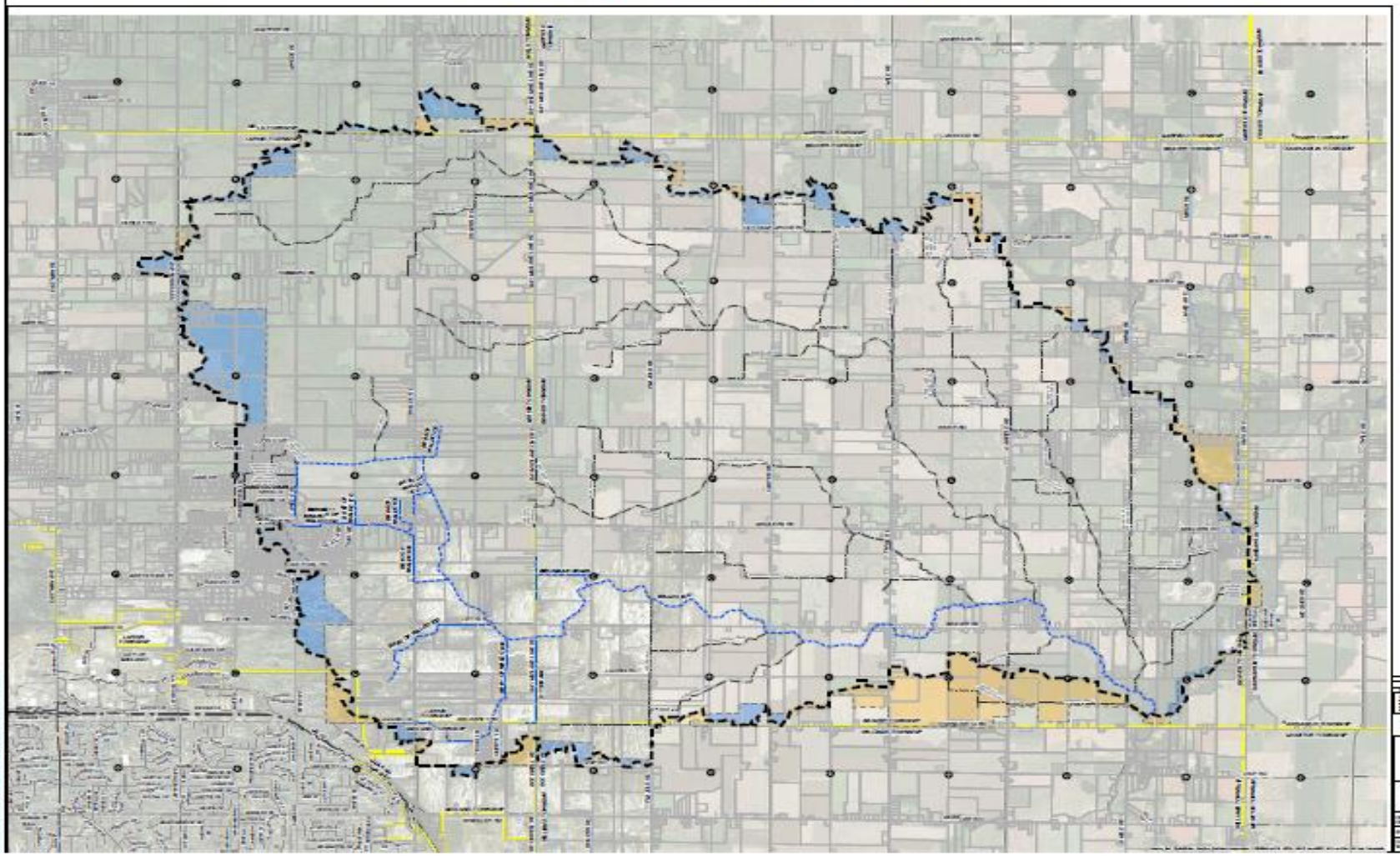
Drainage District

- Drainage district map shows revised boundary
  - Added lands that currently utilize the Waldo Drain, but were not previously in the Drainage District
  - Removed lands that don't currently utilize the Waldo Drain, but were in the Drainage District
- A Day of Review of District Boundary will be held to finalize changes.


BOMBAY RD
MILLS TOWNSHIP
LARKIN TOWNSHIP
GARFIELD TOWNSHIP
BEAVER TOWNSHIP
LINWOOD RD
FRASER TOWNSHIP
KAWKAWLIN TOWNSHIP
HURLEY RD
COTTAGE GROVE RD
HUBBARD RD
PARRISH RD
BOUTELL RD
DOUD RD
WETTERS RD
SIEBERT RD
RIVER RD
SCHMIDT RD
SEIDLERS RD
LETTS RD
BEAVER RD
LAURIA RD
WACKERLY RD
MIDLAND TOWNSHIP
WILLIAMS TOWNSHIP
TOWNLINE 14 RD
CHIP RD
MONITOR TOWNSHIP
EASTMAN RD
EHLERS RD
WALDO RD
FLAJOLE RD
CARTER RD
GARFIELD RD
MAIDA RD
9 MILE RD
8 MILE RD
7 MILE RD
11 MILE RD
BAY MIDLAND LINE RD
ROCKWELL RD
JEFFERSON AVE
MOSHER RD
CITY OF MIDLAND
DE GEER CT
SHERRY CT
MIER RD
RYAN DR
ESTATES DR
ACORN LN
TUPELO DR
JANE DR
KENS LN
JOHNS LN
MONROE RD
OAK PINE TRL
EL RANCHO DR
COMMERCE DR
JULIE ANN DR
OAKBROOK CT
JOSEPH DR
AIRPORT RD
US 10
TEXAS TWN
CHERYL LN

WALDO INTERCOUNTY DRAIN

BAY COUNTY DRAIN COMMISSIONER - JOSEPH RIVET
MIDLAND COUNTY DRAIN COMMISSIONER - DOUGLAS D. ENOS
MICHIGAN DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT - BRADY L. HARRINGTON, P.E.



Drainage District

- Drainage District----------26,672 acres
  - Bay County----------17,105 acres
    - Bay County Parcel Count----------1156
  - Midland County----------9,567 acres
    - Midland County Parcel Count--------1011

Notification

- If you received a notice of this meeting, your property is currently in the Drainage District or proposed to be added to the Drainage District

Engineering

- Survey and inspection of drain
- Hydrologic and hydraulic analysis - flow capacity and culvert sizing
- Development of proposed improvements
- Estimate of cost

Survey and Inspection of Drain

- Surveyed approximately 20 miles of drain
  - Drain elevations at 500 ft. intervals
  - Drain cross sections at 1,000 ft. intervals
  - Topographic features within 50 ft. of drain
- Identified the following items
  - Levels of sedimentation
  - Areas of erosion
  - Log jams and obstructions
  - Crossings that are inadequate

Main Branch upstream of Carter Road

Branch No. 2 downstream of Waldo Road

Branch No. 1 near outlet into Main Branch

Branch No. 3 downstream of Waldo Road

Bennett Drain along Monroe Road

Survey Results

- Waldo Drain – Main Branch
  - Approximately 11.5 Miles in Length
  - Total fall in Main Branch is 84 Ft
    - Average Grade 0.14%
    - 0.5’ to 3’ of sediment in drain
    - Heavy Sedimentation in areas
    - Areas of standing water
    - Areas of brush and vegetation obstructions

Survey Results

- Waldo Drain – Branch No. 1
  - Approximately 2 Miles in Length
  - Total fall in Branch No. 1 is 23.5 Ft
    - Average Grade 0.21%
    - 0.5’ to 3’ of sediment in drain
    - Heavy Obstructions and Sedimentation
    - Areas of severe standing and stagnant water

Survey Results

- Waldo Drain – Branch No. 2
  - Approximately 1.4 Miles in Length
  - Total fall in Branch No. 2 is 24 Ft
    - Average Grade 0.33%
    - 0.5’ to 3’ of sediment in drain
    - Heavy Obstructions and Sedimentation
    - Areas of severe standing and stagnant water

Survey Results

- Waldo Drain – Branch No. 3
  - Approximately 1.5 Miles in Length
  - Total fall in Branch No. 3 is 19.5 Ft
    - Average Grade 0.24%
    - 0.5’ to 3’ of sediment in drain
    - Heavy Sedimentation

Survey Results

- Waldo Drain – Branch No. 4
  - Approximately 0.4 Mile in Length
  - Total fall in Branch No. 4 is 4.3 Ft
    - Typical Grade 0.28%
    - 0.5’ of sediment in majority of drain
    - Areas of standing and stagnant water

Survey Results

- Waldo Drain – Branch No. 5
  - Approximately 0.4 Mile in Length
  - Total fall in Branch No. 5 is 4.3 Ft
    - Average Grade 0.19%
    - 0.5’ to 3’ of sediment in drain
    - Obstructions and Sedimentation
    - Areas of standing and stagnant water

Survey Results

- Waldo Drain – Branch No. 6
  - Approximately 0.4 Mile in Length
  - Total fall in Branch No. 6 is 4.4 Ft
    - Average Grade is 0.22%
    - 0.5’ to 3’ of sediment in drain
    - Obstructions and Sedimentation
    - Areas of standing and stagnant water

Survey Results

- Waldo Drain – Branch No. 7
  - Approximately 0.3 Mile in Length
  - Total fall in Branch No. 7 is 1.8 Ft
    - Average Grade is 0.13%
    - 0.5’ to 3’ of sediment in drain
    - Heavy Obstructions and Sedimentation

Survey Results

- Waldo Drain – Ott Drain Branch
  - Approximately 1.1 Miles in Length
  - Total fall in Ott Drain is 19 Ft
    - Average Grade is 0.38%
    - 0.5’ to 2’ of sediment in drain
    - Obstructions and Sedimentation
    - Areas of standing and stagnant water

Survey Results

- Waldo Drain – Bennett Drain Branch
  - Approximately 0.3 Mile in Length
  - Total fall in Bennett Drain is 16 Ft
    - Typical Grade is 0.75%
    - 0.5’ of sediment in majority of drain
    - Obstructions and Sedimentation

Survey Results

- Waldo Drain – Beckman Drain Branch
  - Approximately 1 Mile in Length
  - Total fall in Beckman Drain is 15 Ft
    - Typical Grade 0.34%
    - 0.5’ to 3’ of sediment in drain
    - Contains two branches (Branch No. 1 and Branch No .2)
    - Obstructions and Sedimentation

Hydrology/Design Flow Capacity

- 10-Year Design Storm
  - 1.6 inches of rainfall in 1 hour
  - 3.3 inches of rainfall in 24 hours

Summary - Open Drain Improvements

- Site Clearing
- Channel Excavation and Channel Cleanout
- Construction of Road Shoulders
- Spoil Leveling and Hauling
- Drain Crossings
- Erosion Control Measures
- Cleanup and Restoration

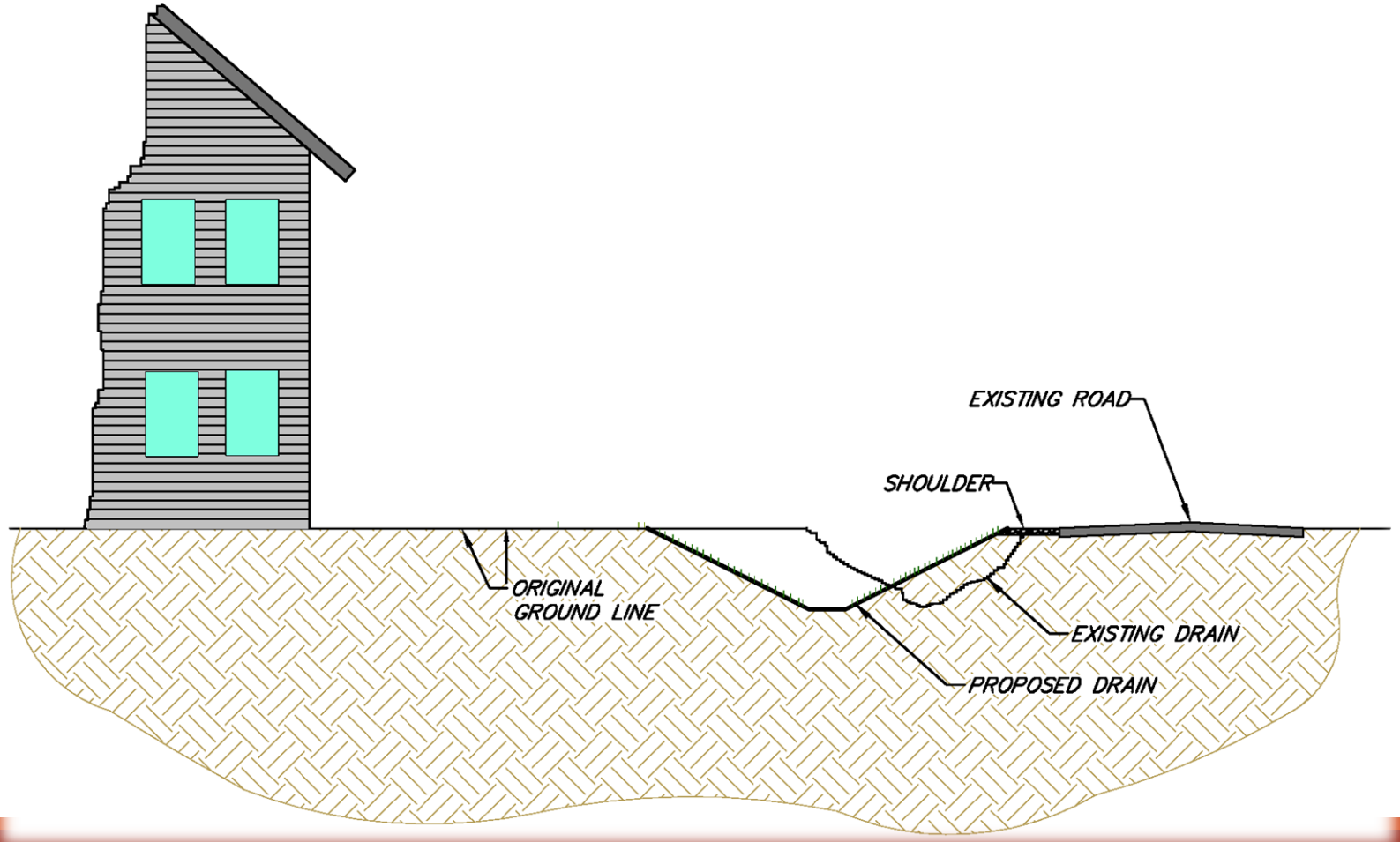
Site Clearing

- Obstructions and debris will be removed from drain including trees and brush
- Maintenance lane along drain cleared on one side or both sides of drain depending on work scope
- All trees, brush and stumps will be disposed of either by burning, burying, chipping or hauling from site

Channel Excavation and Cleanout

- Channel Cleanout
  - Select removal of trees and brush
  - Removal of sediment from drain bottom
  - Spot repair of erosion
  - Excavate from one or both sides of drain
- Channel Excavation
  - Sediment removed from drain bottom
  - Reconstruct original bottom width
  - One or both banks sloped to 2 hor. to 1 vert.
  - All trees and brush grubbed from banks being sloped
  - Excavate from one or both sides of drain

TYPICAL OPEN CHANNEL DETAIL FOR ROAD/LAWN AREAS WITH SHOULDER WORK



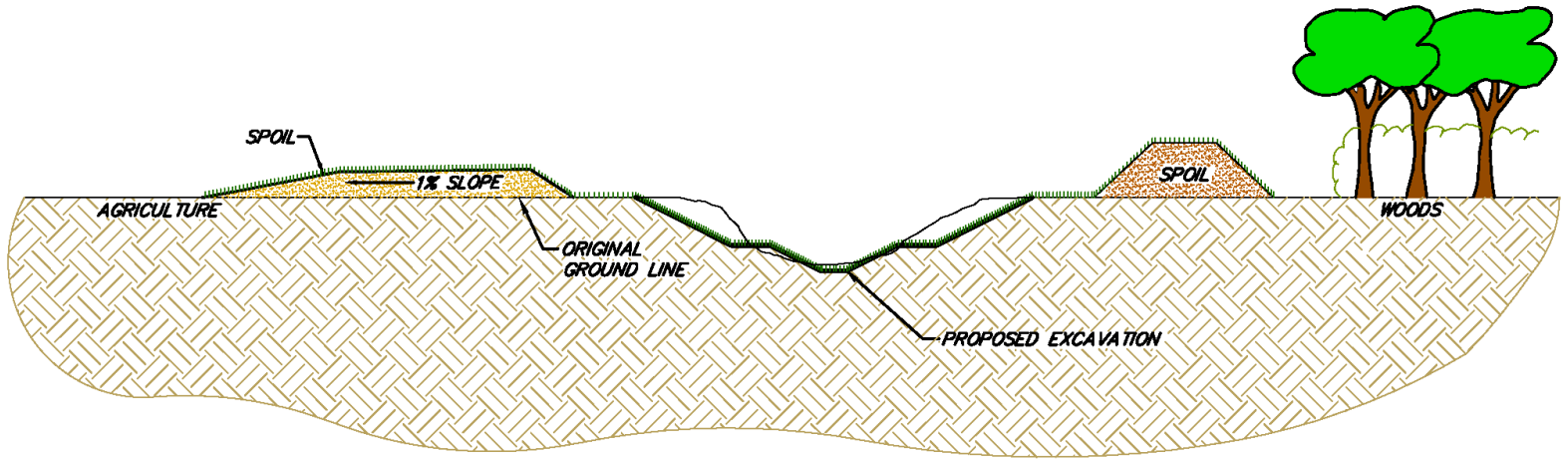
Channel Excavation and Cleanout

- Two-Stage Channel Excavation
  - Construct low flow channel in bottom
  - Construct high flow shelf a few feet above the bottom
  - Both banks sloped to 2 hor. to 1 vert.
  - All trees and brush grubbed from banks being sloped
  - Excavate both sides of drain in most cases

TYPICAL TWO STAGE CHANNEL DETAIL FOR WOOD & AGRICULTURAL AREAS

GRASSED FIELD
OR AGRICULTURE

WOODED

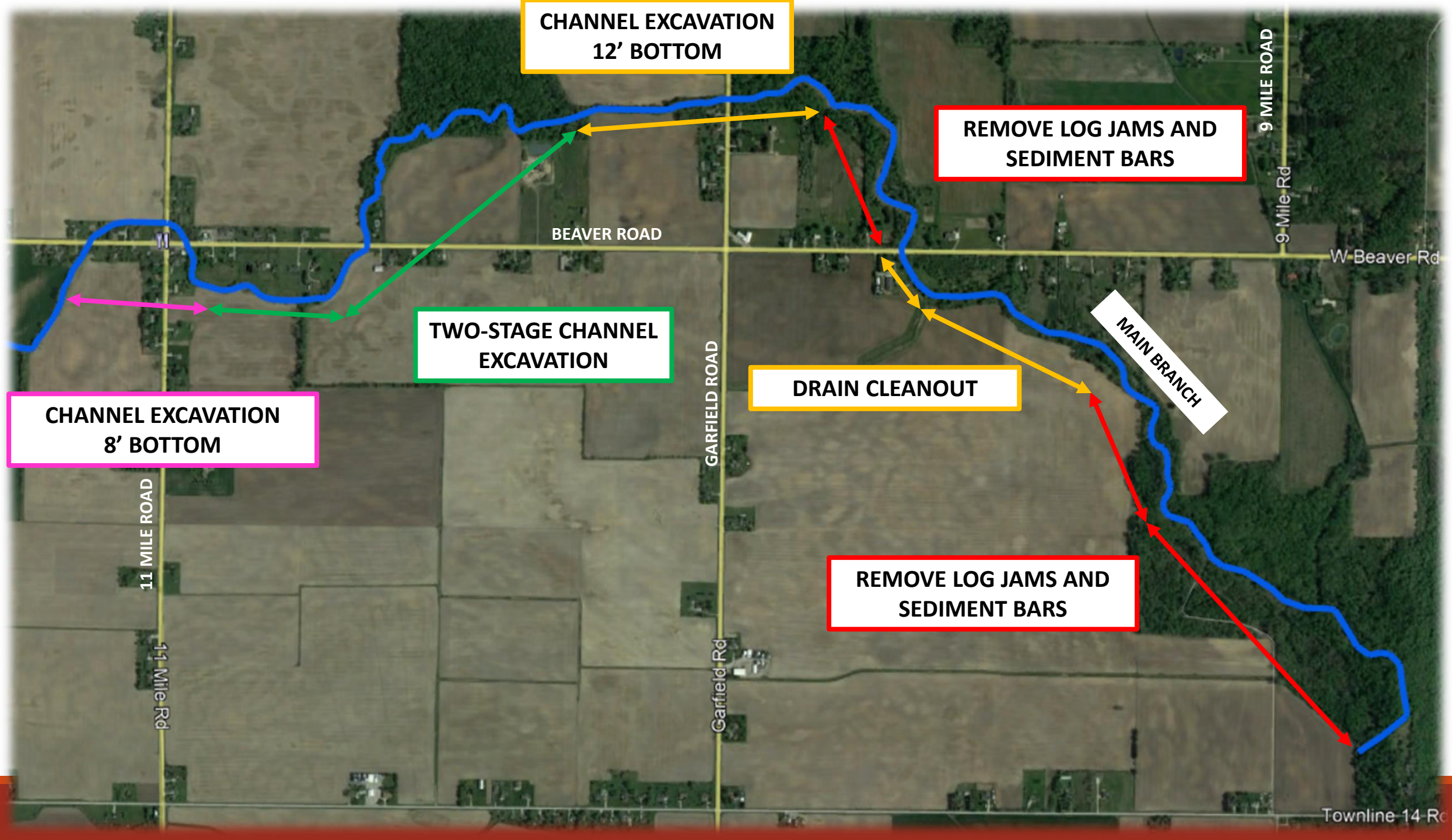


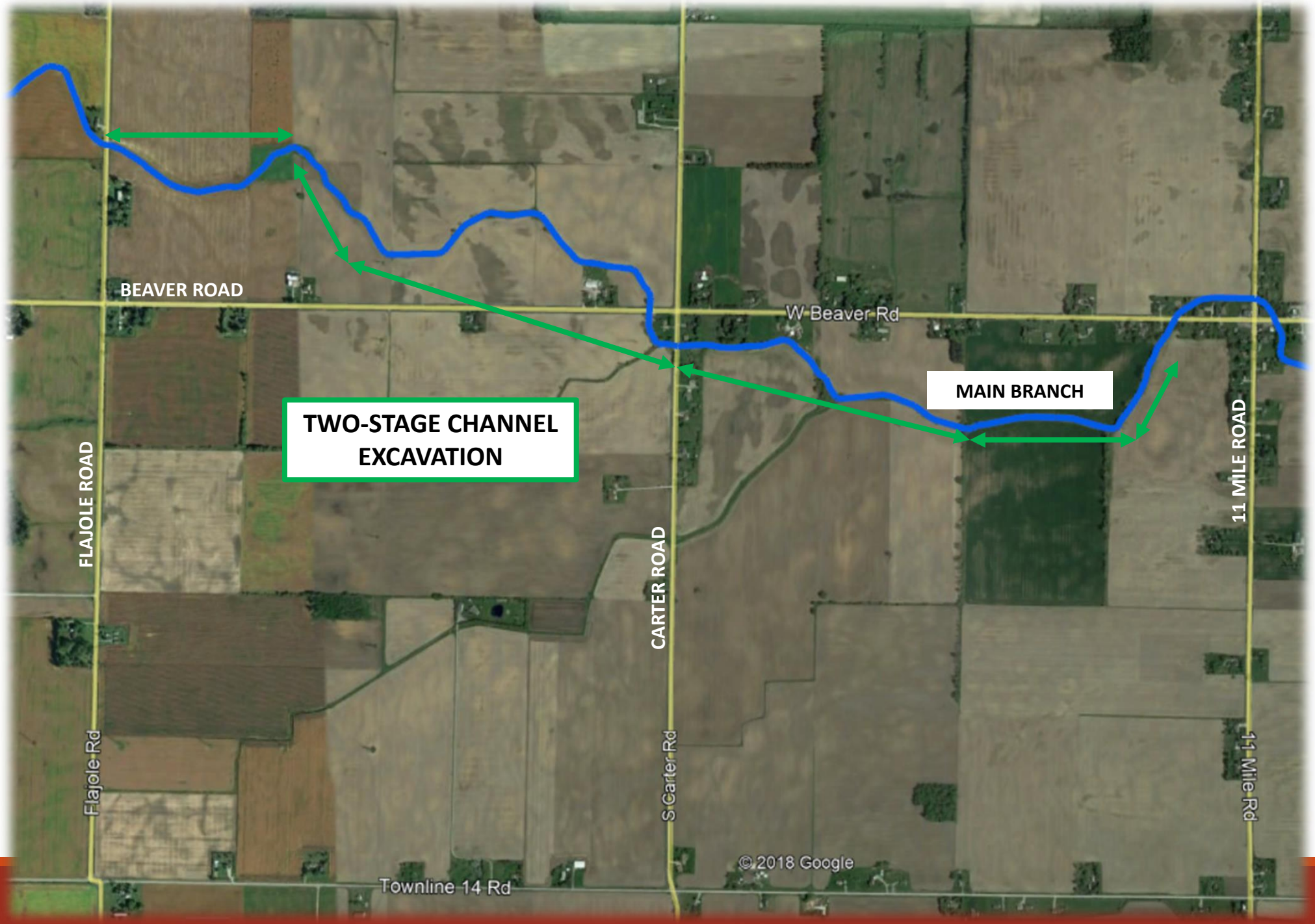
OPENINGS WILL BE LEFT IN SPOILS PILES AS NEEDED FOR DRAINAGE

SPOILS WILL BE HAULED AWAY IN MANICURED LAWN AREAS

Spoil Leveling and Hauling

- Spoils will be leveled within the drain right of way in agricultural and wooded areas
- Spoils will be hauled in lawn areas
- Openings will be left in spoils to allow for drainage


CHANNEL EXCAVATION
12’ BOTTOM
REMOVE LOG JAMS AND
SEDIMENT BARS
9 MILE ROAD
9 Mile Rd
BEAVER ROAD
W Beaver Rd
TWO-STAGE CHANNEL
EXCAVATION
MAIN BRANCH
DRAIN CLEANOUT
CHANNEL EXCAVATION
8’ BOTTOM
GARFIELD ROAD
11 MILE ROAD
11 Mile Rd
Garfield Rd
REMOVE LOG JAMS AND
SEDIMENT BARS
Townline 14 Rd


BEAVER ROAD
W Beaver Rd
MAIN BRANCH
TWO-STAGE CHANNEL EXCAVATION
FLAJOLE ROAD
CARTER ROAD
11 MILE ROAD
Flajole Rd
S Carter Rd
11 Mile Rd
Townline 14 Rd
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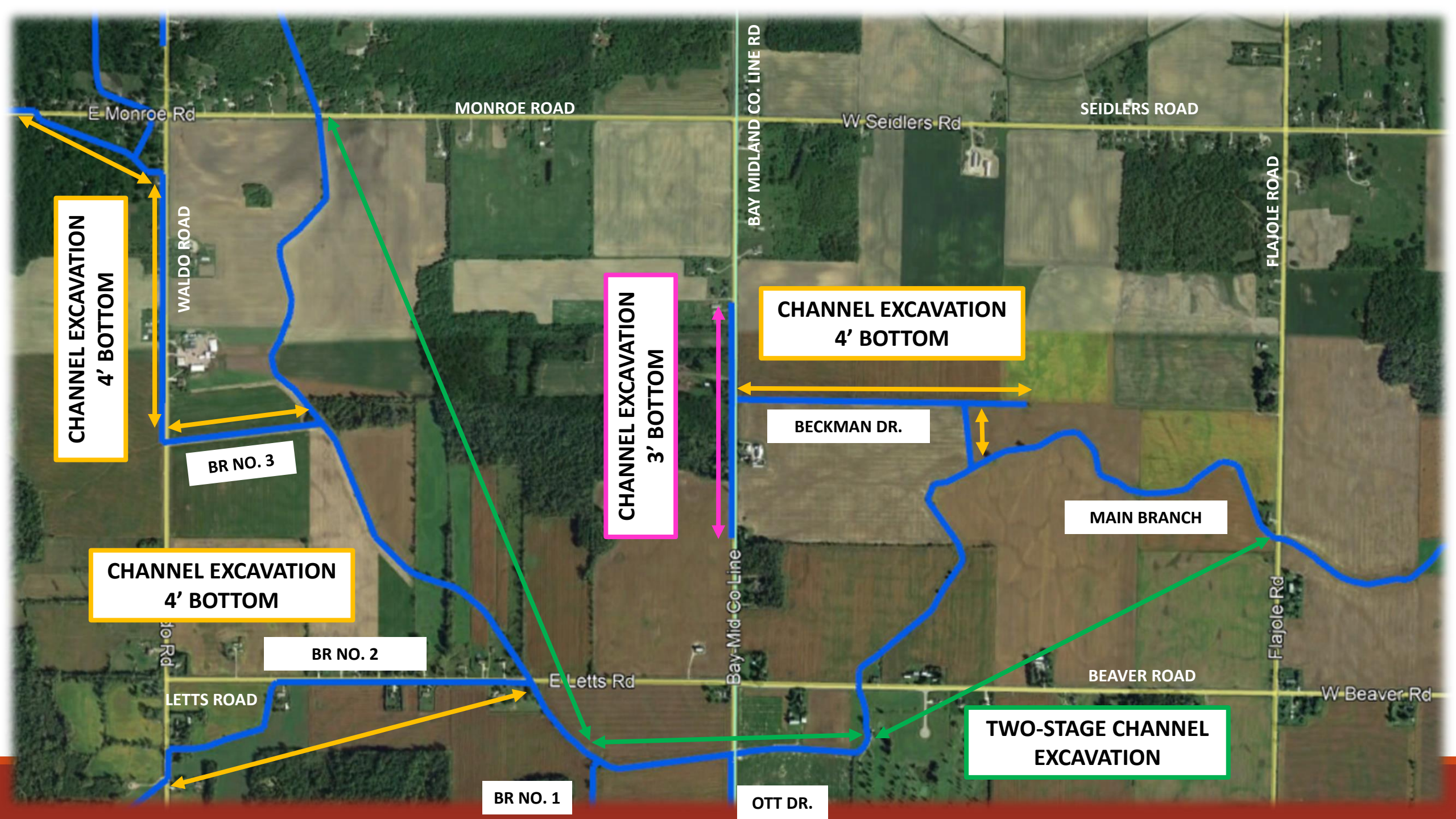
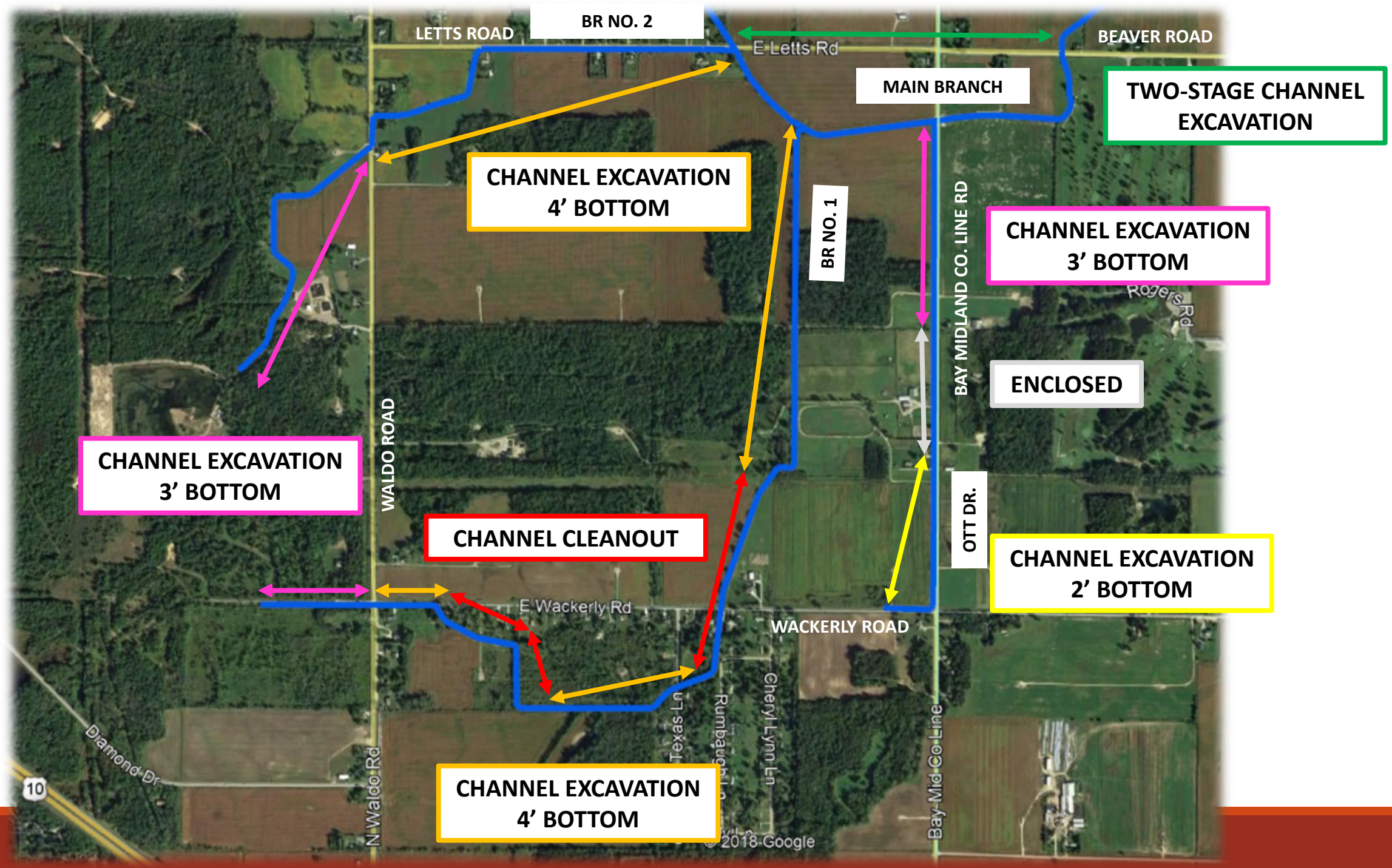

E Monroe Rd
MONROE ROAD
W Seidlers Rd
SEIDLERS ROAD
BAY MIDLAND CO. LINE RD
FLAJOLE ROAD
WALDO ROAD
CHANNEL EXCAVATION
4' BOTTOM
BR NO. 3
CHANNEL EXCAVATION
3' BOTTOM
CHANNEL EXCAVATION
4' BOTTOM
BECKMAN DR.
MAIN BRANCH
CHANNEL EXCAVATION
4' BOTTOM
BR NO. 2
E Letts Rd
LETTS ROAD
Bay-Mid-Co-Line
Flajole Rd
BEAVER ROAD
W Beaver Rd
TWO-STAGE CHANNEL
EXCAVATION
BR NO. 1
OTT DR.


BR NO. 2
LETTS ROAD
E Letts Rd
BEAVER ROAD
MAIN BRANCH
TWO-STAGE CHANNEL EXCAVATION
CHANNEL EXCAVATION 4' BOTTOM
BR NO. 1
BAY MIDLAND CO. LINE RD
CHANNEL EXCAVATION 3' BOTTOM
Rogers Rd
ENCLOSED
CHANNEL EXCAVATION 3' BOTTOM
WALDO ROAD
CHANNEL CLEANOUT
OTT DR.
CHANNEL EXCAVATION 2' BOTTOM
E Wackerly Rd
WACKERLY ROAD
Diamond Dr
10
N Waldo Rd
Texas Ln
Rumbaugh Ln
Cheryl Lynn Ln
Bay Mid Co Line
CHANNEL EXCAVATION 4' BOTTOM
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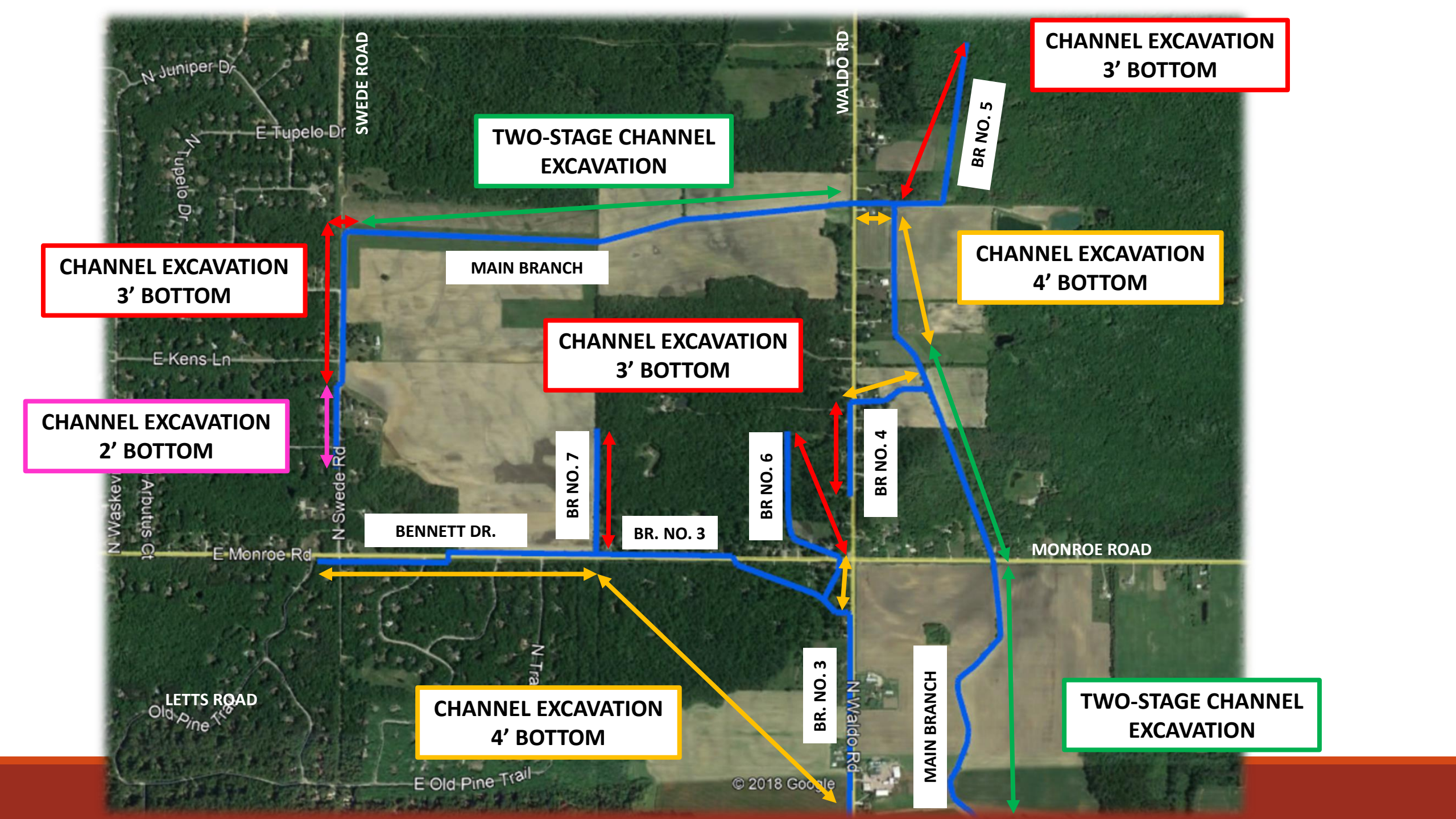
CHANNEL EXCAVATION
3’ BOTTOM
TWO-STAGE CHANNEL
EXCAVATION
BR NO. 5
CHANNEL EXCAVATION
3’ BOTTOM
MAIN BRANCH
CHANNEL EXCAVATION
4’ BOTTOM
CHANNEL EXCAVATION
3’ BOTTOM
CHANNEL EXCAVATION
2’ BOTTOM
BR NO. 7
BR NO. 6
BR NO. 4
BENNETT DR.
BR. NO. 3
MONROE ROAD
BR. NO. 3
MAIN BRANCH
CHANNEL EXCAVATION
4’ BOTTOM
TWO-STAGE CHANNEL
EXCAVATION
LETTS ROAD
SWEDE ROAD
WALDO RD
N Juniper Dr
E Tupelo Dr
N Tupelo Dr
E Kens Ln
N Swede Rd
E Monroe Rd
Arbutus Ct
E Old Pine Trail
N Waldo Rd
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Survey and Inspection of Drain Crossings

- Measured length, elevation and size of drain crossing
  - Culverts and bridges
- Assessed condition of crossings and headwalls
- 130 existing crossings
- 104 crossings determined to be inadequate
  - Undersized hydraulically - waterway opening is too small
  - Poor structural condition
  - Improper elevation - set too high in relation to drain flow line

Drain Crossings

- Culvert and bridge design criteria
  - 0.5 ft. of head loss for design storm
  - Minimum of 1.5 ft. of cover on drive culverts
  - Minimum of 2 ft. of cover on road culverts
  - Farm crossings – 24 ft. drive width
  - Drive crossings – 20 ft. drive width
  - Private Culverts
    - Corrugated Metal Pipe Arches for Large Crossings
    - Polypropylene Pipe for smaller crossings
  - Drive surface to be replaced in-kind
  - County roads – meet county standards

Drain Crossing Summary

- Total of 130 existing drain crossings
  - 102 Private crossings
    - Driveway crossings
    - Farm crossings
    - Yard Enclosures
    - Footbridge crossings
  - 28 Road crossings

Erosion Control

- Vegetation re-establishment
  - Seed drain banks
- Bank erosion prevention
  - Riprap or grassed spillways
  - Riprap placed where high concentration of runoff
  - Riprap or erosion fabric placed at erosion prone areas
- Field tile outlets repaired with splash pads

Cleanup and Restoration

- Disturbed areas will be seeded
- All debris and spoils will be disposed of
- All disturbed lawn areas will be landscape graded and seeded with a minimum of 4” of in-kind topsoil
- Drain must be stabilized prior to final inspection

Planning Level Cost Estimate

- Channel improvements/maintenance to approximately 20 miles of drain
- Replacement of undersized, structurally deficient, and off grade crossings
- Estimated Cost: $5.5 Million

Planning Level Cost Estimate

- Cost Estimate Includes:
  - Construction Costs
  - 10-15% Contingencies
  - Inspection, Survey, & Design
  - Bond and Interest
  - Easements (if necessary)
  - Permitting (if necessary)
  - Construction Administration
  - Utility Coordination
  - Legal
- Actual project cost will be based on contractor's bid

Apportionment of Cost

- Spread onto Assessment District over a period of years
  - 5 to 10 years
- Individual assessments will vary.
- Landowners with special requests can be accommodated and may be assessed for improvement.
- Final assessments will be provided at Day of Review
  - Only estimates outlined in this presentation

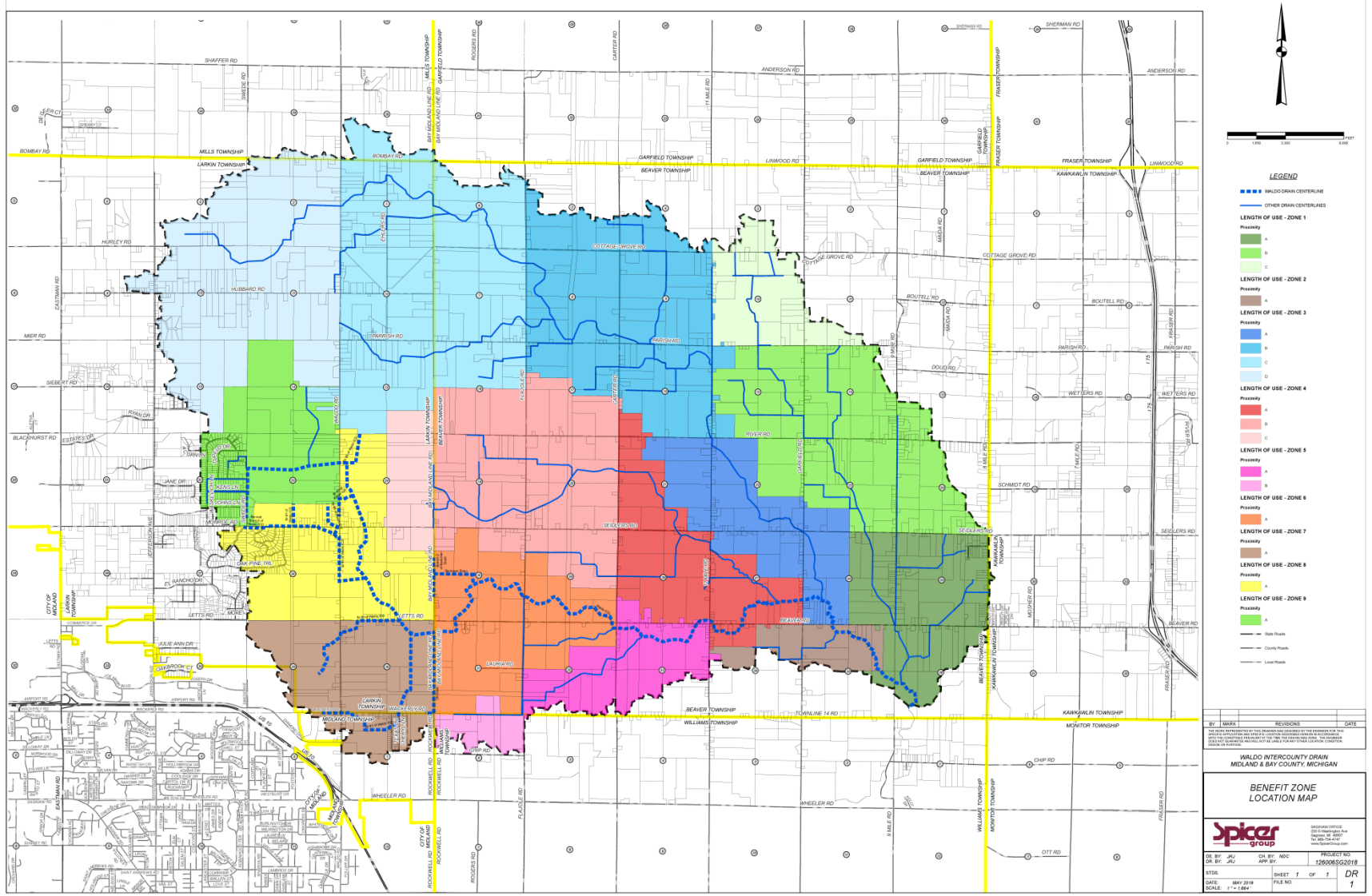
Apportionment of Cost

Typical Cost Breakdown (Bay County)

- County – up to 10%
- Township– 10% to 15%
- MDOT – 5% to 12%
- Railroad – 0% to 2%
- Landowners – 60 % to 72%

WALDO INTERCOUNTY DRAIN

BAY COUNTY DRAIN COMMISSIONER - JOSEPH RIVET
MIDLAND COUNTY DRAIN COMMISSIONER - DOUGLAS D. ENOS
MICHIGAN DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT - BRADY L. HARRINGTON, P.E.



Next Steps, If Determined Necessary

- Final engineering and project scoping: July – August 2019
- Coordination and permitting with impacted utilities and governmental agencies: July 2019
  - MDEQ, Townships, Road Comm., Power, Gas, Phone, Cable
- Bid letting phase: December 2019
- Day of Review of Drainage District Boundary: September 2019
- Day of Review of Apportionments: January 2020
- Project financing and bonding: January - February 2020
- Proceed with construction: February 2020

Next Steps, If Determined Not Necessary

- No further action on current petition
- Subsequent petitions may be filed
- Cost incurred to date will be assessed

Public Testimony

- Fill out speaker cards
- State name and relation to proposed project
- Limit comment to 3 minutes
- Be specific, focus on necessity questions
- Leave copy of materials, if any, with Board

Board Deliberation and Necessity Decision

- Decide if it is necessary to move forward with a project on the Waldo Intercounty Drain

Appeal

- Any person feeling aggrieved by the determination of necessity or no necessity for the project may institute an action in County Circuit Court within **10 days** after the determination by the Board.