Black Creek Consolidated Drain

BOARD OF DETERMINATION OVERVIEW

- **Petition** filed by landowners in Drainage District for improvements
- **Michigan Drain Code** requires a Board of Determination meeting
- **Board** composed of 3 disinterested members from outside affected Townships
- Determine project **necessity** based on public health, convenience or welfare after hearing testimony
PRELIMINARY WORK PERFORMED:

1. Review drainage conditions in ‘study area’ which resulted in a petition
   - Provide an independent and unbiased assessment of the storm water conditions within the ‘study area’.

2. Follow up on landowner issues, concerns and complaints resulting from the Day of Review of Apportionments held on 8/6/15.
   - Inspection reports prepared documenting conditions.

3. Review drain conditions throughout the Drainage District

4. Compile all analyses and report on these findings at a Board of Determination
Black Creek Consolidated Drain

DISTRICT BOUNDARY OVERVIEW:

Drainage District Boundary Information

- Consolidated Drainage District Boundary = 17,549 Acres
  - Casnovia Township = 1,075 Acres
  - Ravenna Township = 99 Acres
  - Moorland Township = 13,212 Acres
  - Egelston Township = 3,163 Acres

- Approximately 1500 properties within Consolidated Drainage District Boundary
- 52.4 miles of Drain
- Composed of 16 Branch Drains
Black Creek Consolidated Drain

EXISTING DRAINAGE CONDITIONS OVERVIEW

Two Main Focus Areas:

1. Study Area (Petitioner Area)
2. District Wide Drain Conditions
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EXISTING DRAINAGE CONDITIONS OVERVIEW

Study Area
(Petitioner Area)

Black Creek Consolidated Drain (Former Smith & Mulder Drain)
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EXISTING DRAINAGE CONDITIONS OVERVIEW

Study Area

- Low area (hatched) with no outlet for surface water
- Reported basement flooding (oval area)
EXISTING DRAINAGE CONDITIONS OVERVIEW

Study Area

Existing Condition: High Groundwater level and no positive outlet. Sump pumps discharge overland and recirculate

Result: Pumping same water, increased electric costs and high potential for structure damage

Residential Home

Ex. Groundwater Elevation

Water Discharged Overland and Recirculated
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EXISTING DRAINAGE CONDITIONS OVERVIEW

Study Area

Photo: 4/14/16 via Google Earth

Visual evidence of standing water
DRAIN TERMINOLOGY:

**CULVERT:** A structure (typically pipe or bridge) placed in the drain (typically at a roadway or driveway) to allow continued stream flow.

- **Issues:** Perched Culverts and Undersized Resulting in Loss of Drain Capacity

**SEDIMENTATION:** Accumulation of sand and dirt within the drain channel

- **Issues:** Loss of Drain Capacity

**OBSTRUCTIONS:** Trees, stumps, heavy vegetation and debris

- **Issues:** Loss of Drain Capacity

**EROSION:** Wearing away of material (typically on drain banks) due to stream flow and/or lack of stability

- **Issues:** Loss of Land and Drain Capacity

All impact & lead to reduced capacity  →  Flooding
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EXISTING DRAINAGE CONDITIONS OVERVIEW

District Wide – Culvert Issues

Reduced Culvert Capacity leading to upstream flooding and downstream erosion

Twin 8’ by 6.5’ CMP Culverts w/ Deteriorating headwalls & Capacity Issues

Residential Drain Crossing on Former Muskegon-Newaygo Drain of B.C.C.
Black Creek Consolidated Drain

EXISTING DRAINAGE CONDITIONS OVERVIEW
District Wide – Culvert Issues

Twin 60” CMP Culverts which are submerged, obstructing flow and barely visible

Partially crushed and disjointed 60” CMP culvert obstructing flow through the Drain at former Muskegon-Newaygo Drain
EXISTING DRAINAGE CONDITIONS OVERVIEW
District Wide – Culvert Issues

Wood culvert (10’ by 4’) with evidence of deterioration, rotting and partial failure on former Muskegon-Newaygo Br. #4.

Culvert Erosion at Former Daley Drain

Heavy Sedimentation in Culvert

Failure location
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EXISTING DRAINAGE CONDITIONS OVERVIEW
District Wide – Sedimentation & Vegetative Overgrowth

Heavy sediment deposition and vegetative growth in the drain channel

Drain centerline of Daley Drain from Bailey Road
EXISTING DRAINAGE CONDITIONS OVERVIEW

District Wide – Sedimentation & Vegetative Overgrowth

Heavy grasses, cattails and vegetative growth in the drain channel have severely restricted flow.

Drain centerline of Muskegon-Newaygo Branch 3 Looking East from Fuller Road.
EXISTING DRAINAGE CONDITIONS OVERVIEW
District Wide – Sedimentation & Vegetative Overgrowth

Looking along the Drain centerline of Muskegon-Newaygo Branch #3

Heavy Brush and Deadfall in the Drain Channel
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EXISTING DRAINAGE CONDITIONS OVERVIEW
District Wide – Sedimentation & Bank Erosion

Factors:
- Stagnant water flow
- Reduced Capacity
- Loss of Land
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EXISTING DRAINAGE CONDITIONS OVERVIEW
District Wide – Surface Flooding

Standing water in the upper watershed of the former HH&G Drain

Inspection report documents the following contributors:

- Excess sedimentation in the Drain
- Undersized culverts
- Perched culverts
- Manmade restrictions (weirs)
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EXISTING DRAINAGE CONDITIONS OVERVIEW

District Wide – the Maintenance Difference

Former Dirkes Drain of B.C.C.

Before Maintenance Work

After Maintenance Work
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EXISTING DRAINAGE CONDITIONS OVERVIEW

District Wide – the Maintenance Difference

Former McSorely Drain of B.C.C.

Before Maintenance Work

After Maintenance Work
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POTENTIAL BRANCH ALIGNMENT

Study Area

Branch Drain is feasible and provides adequate outlet for both documented flooding issues in the study area.
**POTENTIAL SOLUTIONS TO ALLEVIATE BASEMENT FLOODING**

**Study Area**

**Black Creek Consolidated Drain**

Proposed Condition: Sump pumps discharge to positive outlet

Result: Reduced electric costs and much lower potential for structure damage

**Diagram:**
- **Typical Sump Pump System**
- **Ex. Groundwater Elevation**
- **Residential Home**
- **Provides Positive Outlet for Sump Pumps**
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Next Steps

• Public Testimony

• Board to Determine Necessity of Petition

• If project found not necessary:
  • Project ends

• If project found necessary:
  • Evaluate scope of project and design alternatives
  • Scope Meeting to discuss design with property owners and Municipalities
  • Finalize Design (obtain easements and permits, if necessary, and prepare bid plans for construction)