State of Michigan
Department of Natural Resources and Environment

Water Resources Division
27700 Donald Court
Warren MI, 48092-2793
586-753-3700

File No. 10-74-0104-P

Date: December 10, 2010

PUBLIC NOTICE

The St. Clair County Drain Commissioner, Attn: Robert Wiley, 21 Airport Drive, St. Clair, Michigan 48079, has applied to this office for a permit under authority of Part 301, Inland Lakes and Streams, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The applicant proposes to dredge and fill within the Gossman Drain and Branches 1, 2, and 3 for the purpose of alleviating flooding by restoring sufficient outlets for the storm sewer system in an existing subdivision. The project is located north of North River Road between Parker Road and the Old Farm Subdivision. Approximately 4,704 linear feet of existing drain will be impacted with a total of 6,845 linear feet of proposed new, relocated or enclosed channel. A total of 2,181 linear feet of drain will be enclosed and 1,455 linear feet will be abandoned. Existing culverts will be replaced and new culverts installed in a total of 5,183 linear feet of enclosed drain. Approximately 4,888 cubic yards of fill will be used for the project and 15,439 cubic yards of spoils will be removed. Spoils will be disposed off-site. A project total of 703 cubic yards of riprap will be used for bank stabilization, cross-vanes and placed at the culvert ends. Main Branch – A total of 550 linear feet of culvert will be replaced or remain in place. Branch 1 – Approximately 1,455 linear feet of existing drain will be filled and 1,230 linear feet of new drain created. A gabion channel will be constructed over 80 linear feet and a riffle constructed over 140 linear feet. Approximately 2,517 linear feet of channel will be graded to provide in-line detention to aid stormwater control. Approximately 92 linear feet will be regraded to create a low flow channel. A total of 608 linear feet of replacement culverts will be installed. Branch 2 – Approximately 887 linear feet of drain will be excavated. Approximately 3,122 linear feet of replacement culvert will be installed. Branch 3 – Approximately 280 linear feet of drain will be excavated and a total of 903 linear feet will be enclosed in 30 inch diameter pipe. The project is located in T7N, R17E, Sections 28, 29, and 30, Fort Gratiot Township, St Clair County, Michigan, in accordance with plans attached to this notice.

THIS NOTICE IS NOT A PERMIT

The proposed project may also be regulated by one or more additional parts of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, that are administered by the Water Resources Division. The requirements of applicable parts are considered in determining if it is in the public interest to issue a permit.

When a permit application is received requesting authorization to work in or over the inland waters of the State of Michigan, pursuant to PART 301, INLAND LAKES AND STREAMS, OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451, AS AMENDED, the Act provides that the department submit copies for review to the department of public health, the city, village or township, and the county where the project is to be located, the local soil conservation district, any local watershed council organized under Part 311, and the local port commission. Additional notification is provided to certain persons as required by statute or determined by the department.

Those persons wanting to make comments on the proposed project shall furnish this office with their written comments no later than 20 days from the date of this notice. Written comments will be made part of the record and should reference the above file number. Objections must be factual, specific, and fully describe the reasons upon which any objection is founded. Unless a written request is filed with the department within the 20-day public comment period, the department may make a decision on the application without a public hearing. The determination as to whether a permit will be issued or a public hearing held will be based on evaluation of all relevant factors defined in Sections 30106 and 30311, or permit criteria defined by other appropriate Parts of the NREPA. These

Sections address the effect of the proposed work on the public trust or interest including navigation, fish, wildlife, and water quality among other criteria. Public comments received will also be considered.

This application will be reviewed by federal agencies in accordance with an agreement with the U.S. Environmental Protection Agency, under provisions of Section 404 of the Federal Clean Water Act Amendments of 1977.

cc: DNRE, Wildlife, Natural Heritage
DNRE, Wildlife, Southfield
St Clair Co. Clerk
St Clair Co. Drain Commission
St Clair County Drain Commissioner, applicant
WRD, Floodplains, Warren, M. Zingas
USACE
USFWS
see file for adjacent property owners
DNRE, Fisheries, Southfield
St Clair Co. Health Dept.
Fort Gratiot Township Clerk
St Clair Soil Conservation Dist.
History Division
WRD, WLSU, 404 Coordinator
USEPA
Huron Consultants

AGENCY USE

Previous USACE Permit or File Number	RECEIVED	Land and Water Management Division, MDEQ File Number
		10-74-0104-P
USACE File Number	OCT 12 2010	Pre-application Number or Marina Operating Permit Number
District Office	DNRE/WRD	Fee received $
SEM / Warren - Dave Dortman	PERMIT CONSOLIDATION UNIT	3000 ck #7531

Date Received

AGENCY USE

Read Instructions pages i - iii. All of the following boxes below must be checked and information provided for the application to be processed:

- ☒ **All items in Sections 1 through 9 are completed**
- ☒ **Items in Sections 10 through 21 that apply to the project are completed**
- ☒ **Dimensions, volumes and calculations are provided**
- ☒ **Reproducible location map, site plan(s), cross sections and photographs are provided, one set must be black and white on 8 ½ by 11 inch paper.**
- ☒ **Date project was staked** *9-15-09*
- ☒ **Application fee is attached**
- ☒ **All requested supplementary attachments (➡) are included**
- ☒ **List any additional attachments, tables, etc.:** *Project Narrative, Supplemental Sections 3, 4, 5, 8, 10, & 14, Cross Sections, SCS Method Calulations for Detention Volume, Bankfull Bench Design Calculations per SCCDC Regional Curves, Rosgen Method Cross Vane Design Equations and Rock Size Table, HY-8 Culvert Analysis Report, Channel Flow Analysis, Culvert Replacement Table and Old Farm Subdivision Rational Method Hydraulic Calculations*

1 PROJECT LOCATION INFORMATION

- Refer to your property's legal description for the Township, Range, and Section information, and your property tax bill for your Property Tax Identification Number(s).

Site location Address (road, if no street address)	Zip Code	Township Name(s)	Township(s)	Range(s)	Section(s)
Various road crossings	*48059*	*Fort Gratiot*	*7N*	*17E*	*28, 29, 30*

City/Village	County(ies)	Property Tax Identification Number(s)	
	St. Clair	*various*	
Name of Waterbody *Gossman Drain*	Project Name or Job Number *04-1228*	Subdivision/Plat *Old Farm Sub and others*	Lot Number / Private Claim

Project types (check all that apply): ☐ private ☒ public/government ☐ industrial ☐ commercial ☐ multi-family ☐ building addition ☐ new building or structure ☐ building renovation or restoration ☒ river restoration ☐ single-family ☐ project is receiving federal transportation funds ☒ other (explain) *county drain project*

The proposed project is on, within, or involves (check all that apply) ☒ a legally established County Drain (date established) (M/D/Y) *10/08/1927*

☒ a stream	☐ a pond (less than 5 acres)	☐ a Great Lake or Section 10 Waters	☐ a natural river	☐ a new marina
☐ a river	☐ a channel/canal	☐ a designated high risk erosion area	☐ a dam	☐ a structure removal
☒ a ditch or drain	☐ an inland lake (5 acres or more)	☐ a designated critical dune area	☐ a wetland	☐ a utility crossing
☐ a floodway area	☐ a 100-year floodplain	☐ a designated environmental area	☒ 500 feet of an existing waterbody	

2 DESCRIBE PROPOSED PROJECT AND ASSOCIATED ACTIVITIES, AND THE CONSTRUCTION SEQUENCE AND METHODS (attached additional sheets)

Written Summary of All Proposed Activities. *See attached Project Narrative.*

Construction Sequence and Methods. *Construction sequence will be up to the contractor except that it must be seqenced to minimize soil erosion and sedimentation, and to prevent flooding during construction.*

3 APPLICANT, AGENT/CONTRACTOR, AND PROPERTY OWNER INFORMATION

Owner/Applicant (individual or corporate name)	Agent/Contractor (firm name and contact person)
Robert Wiley, St. Clair County Drain Commissioner	*Huron Consultants, Eric J. Ostling, PE*
Mailing Address *21 Airport Drive*	Address *901 Huron Avenue, Suite 8*
City *St. Clair* State *MI* Zip Code *48079*	City *Port Huron* State *MI* Zip Code *48060*
Daytime Phone Number with Area Code *810-364-5369* Cell Phone Number - -	Daytime Phone Number with Area Code *810-966-0680* Cell Phone Number *810-434-3828*
Fax *810-364-7240* E-mail *rwiley@stclaircounty.org*	Fax *810-966-0681* E-mail *eostling@huronconsultants.com*

☒ No ☐ Yes Is the applicant the sole owner of all property on which this project is to be constructed and all property involved or impacted by this project?
➡ If no, attach letter(s) of authorization from all owners. A letter signed by each property owner authorizing the agent/contractor/other owner to act on his or her behalf or a copy of easements or right-of-ways must be provided. If multiple property owners, also attach a list of all owners along with their names, mailing addresses, and telephone numbers. If the applicant is a corporation, a corporate officer must provide written document authorizing any agent/contractor listed above to act on its behalf.
A letter of authorization must be provided from an owner receiving dredge spoils on their property, or where access through their property is required..

Property Owner's Name (If different from applicant)	Mailing Address
See attached list.	

Daytime Phone Number with Area Code	Cell Phone Number	City	State	Zip Code
- -	- -			

☒ No ☐ Yes Is there a MDEQ conservation easement or other easement, deed restriction, lease, or other encumbrance upon the property in the project area?
➡ If yes, attach a copy.

4 PROPOSED PROJECT PURPOSE, INTENDED USE, AND ALTERNATIVES CONSIDERED (Attach additional sheets if necessary)

Purpose/Intended Use: The purpose must include any new development or expansion of an existed land use. *See attached additional sheets*

Alternatives: Include a description of alternatives considered to avoid or minimize resource impacts. Include factors such as, but not limited to, alternative construction technologies; alternative project layout and design; and alternative locations. For utility crossings, include both alternative routes and alternative construction methods.
See attached additional sheets

5 LOCATING YOUR PROJECT SITE

➡Attach a black and white, legible copy of a map that clearly shows the site location and road from the nearest major intersection, and includes a north arrow.

Is there an access road to the project? ☐ No ☒ Yes (If Yes, type of road, check all that apply) ☐ private ☒ public ☒ improved ☐ unimproved

Name of roads at closest main intersection *See attached plans cover sheet and additional sheets* and

Directions from main intersection *See attached plans cover sheet and additional sheets*

Style of house or other building on site ☐ ranch ☐ 2-story ☐ cape cod ☐ bi-level ☐ cottage/cabin ☐ pole barn ☐ none ☐ other (describe)

Color | Color of adjacent property house and/or buildings | House number | Street name

Fire lane number | Lot number | Address is visible on ☐ house ☐ garage ☐ mailbox ☐ sign ☐ other (describe)

How can your site be identified if there is no visible address? *See attached plans cover sheet and additional sheets*

Provide directions to the project site, with distances from the best and nearest visible landmark and waterbody *See attached plans and additional sheets*

Does the project cross the boundaries of two or more political jurisdictions? (City/Township, Township/Township, County/County, etc.)
☒ No ☐ Yes ➡ If Yes, list jurisdictions:

6 List all other federal, interstate, state, or local agency authorizations required for the proposed activity, including all approvals or denials received.

Agency	Type approval	Identification number	Date applied	Date approved / denied	If denied, reason for denial
St. Clair Co. Road Comm permits			*Pending*		

7 COMPLIANCE

If a permit is issued, date activity will commence (M/D/Y) *12/01/10*

Proposed completion date (M/D/Y) *12/31/2011*

Has any construction activity commenced or been completed in a regulated area? ☒ No ☐ Yes
➡If Yes, identify the portion(s) underway or completed on drawings or attach project specifications and give completion date(s) (M/D/Y) / /

Were the regulated activities conducted under a MDEQ permit? ☐ No ☐ Yes
If Yes, list the MDEQ permit number *N/A*

Are you aware of any unresolved violations of environmental law or litigation involving the property? ☒ No ☐ Yes (If Yes, explain)

8 ADJACENT/RIPARIAN AND IMPACTED OWNERS (Attach additional sheets if necessary)

- Complete information for all adjacent and impacted property owners and the ~~lake association~~ or ~~established~~ lake board, including the contact person's name.
- If you own the adjacent lot, provide the requested information for the first adjacent parcel that is not owned by you.

Property Owner's Name	Mailing Address	City	State	Zip Code
See attached list				

RECEIVED
OCT 12 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

Name of ☐ Established Lake Board ☐ or Lake Association
and the Contact Person's name, phone number, and mailing address

9 APPLICANT'S CERTIFICATION READ CAREFULLY BEFORE SIGNING

I am applying for a permit(s) to authorize the activities described herein. I certify that I am familiar with the information contained in this application; that it is true and accurate; and, to the best of my knowledge, that it is in compliance with the State Coastal Zone Management Program. I understand that there are penalties for submitting false information and that any permit issued pursuant to this application may be revoked if information on this application is untrue. I certify that I have the authority to undertake the activities proposed in this application. By signing this application, I agree to allow representatives of the MDEQ, USACE, and/or their agents or contractors to enter upon said property in order to inspect the proposed activity site and the completed project. I understand that I must obtain all other necessary local, county, state, or federal permits and that the granting of other permits by local, county, state, or federal agencies does not release me from the requirements of obtaining the permit requested herein before commencing the activity. I understand that the payment of the application fee does not guarantee the issuance of a permit.

☐ Property Owner ☒ Agent/Contractor ☐ Corporation/Public Agency – Title *Project Engineer*	Printed Name *Eric J. Ostling, P.E., C.F.M.*	Signature	Date (M/D/Y) *10/07/10*

US Army Corps of Engineers (USACE) Revised Michigan Department of Environmental Quality (MDEQ) DEQ

10 PROJECTS IMPACTING WETLANDS OR FLOODPLAINS OR LOCATED ON AN INLAND LAKE OR STREAM OR A GREAT LAKE

- Check boxes A through M that may be applicable to your project and provide all the requested information.
- If your project may affect wetlands, also complete Section 12. If your project may impact regulated floodplains, also complete Section 13.
- To calculate volume in cubic yards (cu yd), multiply the average length in feet (ft) times the average width (ft) times the average depth (ft) and divide by 27.
- Some projects on the Great Lakes require an application for conveyance prior to Joint Permit Application completeness.

➡ Provide a cross-section and overall site plan showing existing lakes, streams, wetlands, and other water features; existing structures; and the location of all proposed structures, land change activities and soil erosion and sedimentation control measures. Review Appendix B and EZ Guides for completing site-specific drawings.

➡ Provide tables for multiple impact areas or multiple activities and provide fill and excavation/dredge calculations.

RECEIVED
DEC 03 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

Water Level Elevation

On a Great Lake use IGLD 85 ☐ surveyed ☐ converted from observed still water elevation. On inland waters, ☐ NGVD 29 ☒ NAVD 88 ☐ other

Observed water elevation (ft) *N/A* date of observation (M/D/Y)

☒ **A. PROJECTS REQUIRING FILL** (See All Sample Drawings)

- Attach both overall site plan and cross-section views to scale showing maximum and average fill dimensions.

(Check all that apply) ☒ floodplain fill ☐ wetland fill ☐ riprap ☐ seawall, bulkhead, or revetment ☒ bridge or culvert ☐ boat launch ☐ off-shore swim area ☐ beach sanding ☐ boatwell ☐ crib dock ☐ other

Fill dimensions (ft)	Total fill volume (cu yd)	Maximum water depth in fill area (ft)
length *varies* width *varies, see table* maximum depth *8 feet*	*4,888*	*N/A*

Type of clean fill ☐ pea stone ☒ sand ☒ gravel ☐ wood chips ☒ other *native soil*

Will filter fabric be used under proposed fill? ☒ No ☐ Yes (If Yes, type)

Source of clean fill ☒ on-site, ➡ If on-site, show location on site plan. ☒ commercial ☐ other, ➡ If other, attach description of location.

Fill will extend *N/A* feet into the water from the shoreline and upland feet out of the water. Fill volume below OHWM (cu yd) *2,178*

☒ **B. PROJECTS REQUIRING DREDGING OR EXCAVATION** (For dredging projects see Sample Drawing 7, for excavation see other applicable Sample Drawings)

- Attach both overall site plan and cross-section views to scale showing maximum and average dredge or excavation dimensions and dredge disposal location.
- Refer to www.michigan.gov/jointpermit for disposal requirements and authorization.

(Check all that apply) ☐ floodplain excavation ☐ wetland dredge or draining ☐ seawall, bulkhead, or revetment ☐ navigation ☐ boat well ☐ boat launch ☒ other *drain excavation*

Total dredge/excavation volume (cu yd)	Dimensions	Dredge/excavation volume below OHWM (cu yd)	Method and equipment for dredging
15,439	length *varies* width *vary* depth *vary*	*1,407*	*mechanical excavators*

Has proposed dredge material been tested for contaminants? ☒ No ☐ Yes ➡ If Yes, provide test results with a map of sampling locations.

Dredged or excavated spoils will be placed ☒ on-site ☒ off-site. ➡ Provide detailed disposal area site plan and location map. ➡ Provide letter of authorization from owner, if disposing of spoils off site.

Has this same area been previously dredged? ☐ No ☒ Yes If Yes, date and permit number: / / / *Construction and maintenance*

If Yes, are you proposing to enlarge the previously dredged area? ☐ No ☒ Yes

Is long-term maintenance dredging planned? ☒ No ☐ Yes If Yes, when and how much?

☒ **C. PROJECTS REQUIRING RIPRAP** (See Sample Drawings 2, 3, 8, 12, 14, 17, 22, and 23. Others may apply)

Riprap waterward of the ☐ shoreline OR ☒ ordinary high water mark	Dimensions (ft) length *vary* width *vary* depth *vary*	Volume(cu yd) *372*
Riprap landward of the ☐ shoreline OR ☒ ordinary high water mark	Dimensions (ft) length *vary* width *vary* depth *vary*	Volume(cu yd) *331*

Type of riprap ☐ field stone ☒ angular rock ☒ other *Clean crushed concrete*

Will filter fabric be used under proposed riprap? ☐ No ☒ Yes (If Yes, type) *nonwoven*

☐ **D. SHORE PROTECTION PROJECTS** (See Sample Drawings 2, 3, and 17) Complete Sections 10A, B, and/or C above, as applicable.

(check all that apply) ☐ riprap – length (ft) ☐ seawall/bulkhead – length (ft) ☐ revetment – length (ft)

Distances of project from both property lines (ft)

☐ **E. DOCK - PIER – MOORING PILINGS – ROOFS** (See Sample Drawing 10)

Dock Type ☐ open pile ☐ filled ☐ crib Seasonal support structure? ☐ No ☐ Yes

Permanent Roof? ☐ No ☐ Yes Mounted on Maximum Dimensions: length width height

Proposed structure dimensions (ft) length width

Dimensions of nearest adjacent structures (ft) length width

☐ **F. BOAT WELL** (See EZ Guides)

Type of sidewall stabilization ☐ wood ☐ steel ☐ concrete ☐ vinyl ☐ riprap ☐ other

Boat well dimensions (ft) length width depth

Number of boats

Volume of backfill behind sidewall stabilization (cu yd)

Distances of boat well from adjacent property lines (ft)

☐ **G. BOAT LAUNCH** (See EZ Guide) (check all that apply) ☐ new ☐ existing ☐ public ☐ private ☐ commercial ☐ replacement

Proposed overall boat launch dimensions (ft) length width depth

Type of material ☐ concrete ☐ wood ☐ stone ☐ other

Existing overall boat launch dimensions (ft) length width depth

Boat launch dimensions (ft) below ordinary high water mark length width depth

Distances of launch from both property lines (ft)

Number of adjacent Skid piers

Skid pier dimensions (ft) length width

☐ **H. BOAT HOIST** (See EZ Guide)

(Check all that apply) ☐ seasonal ☐ permanent ☐ cradle ☐ side lifter ☐ other

located on ☐ seawall ☐ dock ☐ bottomlands

13 FLOODPLAIN ACTIVITIES (See Sample Drawing 5. Others may apply.) For more information go to www.michigan.gov/deqfloodplainmanagement

- Complete Sections 10 A and 10 B and other Sections, as applicable.
- A hydraulic analysis or hydrologic analysis may be required to fully assess floodplain impacts. ➡ Attach hydraulic calculations.

➡ Attach additional sheets or tables with the requested information when multiple floodplain activities are included in this application.

(check all that apply) ☐ fill ☐ excavation ☒ other ***Total drainage area is less than two square miles***

Site is feet above ☐ ordinary high water mark (OHWM) OR ☐ observed water level. Date of observation (M/D/Y) / /

Fill volume below the 100-year floodplain elevation (cu yd)	Compensating cut volume below the 100-year floodplain elevation (cu yd)

14 BRIDGES AND CULVERTS (Including Foot and Cart Bridges) (See Sample Drawings 5, 14A, 14B, 14C, 14D, and EZ Guides)

- Provide detailed site-specific drawings of existing and proposed Plan and Elevation View, (Sample Drawing 14A), Elevation View (Sample Drawing 14B), Stream and Floodplain Cross-Section (Sample Drawing 14C), Stream Profile (Sample Drawing 14D) and Floodplain Fill (Sample Drawing 5) at a scale adequate for detailed review.
- Provide the requested information that applies to your project. If there is not an existing structure, leave the "Existing" column blank.
- If you choose to have a Licensed Professional Engineer "certify" that your project will not cause a "harmful interference" for a range of flood discharges up to and including the 100-year flood discharge, then you must use the "Required Certification Language." You may request a copy by phone, email, or mail. A hydraulic report supporting this certification may also be required. Is Certification Language attached? ☒ No ☐ Yes

➡ Attach additional sheets and table with the requested information for multiple crossings. Include hydraulic calculations.

RECEIVED DEC 0 3 2010 DNRE/WRD PERMIT CONSOLIDATION UNIT

		Existing	Proposed			Existing	Proposed
Culvert type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		***see attch***	***sheets***	Bridge span (length perpendicular to stream) OR culvert ☐ width ☐ diameter (ft)			
Bridge type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)			
Entrance design (projecting, mitered, wingwalls, etc.)				Bridge rise (from bottom of beam to streambed) Culvert rise (fill from top of culvert to streambed) (ft)			
Total structure waterway opening above streambed (sq ft)				Approach slope fill from existing grade to culvert or bridge			
☐ elevation of culvert crown	Upstream			Higher elevation of ☐ culvert invert OR	Upstream		
☐ bottom of bridge beam (ft)	Downstream			☐ streambed within culvert (ft)	Downstream		
Elevation of road grade at structure (ft)				Distance from low point of road to mid-point of bridge crossing (ft)			
Elevation of low point in road (ft)							

Cross-sectional area of primary channel (sq ft) (See Sample Drawing 14C)	Average stream width at OHWM outside the influence of the structure (ft)	Upstream / Downstream

Reference datum used (show on plans with description) ☐ NGVD 29 ☐ NAVD 88 ☐ IGLD 85 (Great Lakes coastal areas) ☐ other

High water elevation – describe reference point and highest known water level above or below reference point and date of observation.

15 STREAM, RIVER, OR DRAIN CONSTRUCTION ACTIVITIES (No sample drawing available)

- Complete Section 10A for fill, Section 10B for dredge or excavation, and Section10C for riprap activities.
- If side casting or other proposed activities will impact wetlands or floodplains, complete Sections 12 and 13, respectively.

➡ Provide an overall site plan showing existing lakes, streams, wetlands, and other water features; existing structures; and the location of all proposed structures and land change activities.

➡ Provide cross-section (elevation) drawings necessary to clearly show existing and proposed conditions. Be sure to indicate drawing scales.

➡ For activities on legally established county drains, provide original design and proposed dimensions and elevations.

(check all that apply) ☒ maintenance ☒ improvement ☐ relocation ☒ enclosure ☒ new drain ☐ wetlands ☐ other

Dimensions (ft) of existing stream/drain channel to be worked on. length ***4,704 ft*** width ***varies*** depth ***see plans***

Dimensions (ft) of new, relocated, or enclosed stream/drain channel. length ***6,845 ft*** width ***varies*** depth ***see plans***	Volume of dredge/ excavation (cu yds) ***15,439***
Existing channel average water depth in a normal year (ft) ***one foot***	Proposed side slopes (vertical / horizontal) ***existing or 1 on 2***

How will slopes and bottom be stabilized? ***by seeding and mulch/mulch blankets, occassionally riprap armor***

Will old/enclosed stream channel be backfilled to top of bank grade? ☐ No ☒ Yes	Length of channel to be abandoned (ft) ***1,455***	Volume of fill (cu yds) ***2,036***

If an enclosed structure is proposed, check type ☒ concrete ☒ corrugated metal ☒ plastic ☐ other ***varies, see plans***

Dimensions of the structure: diameter ***varies*** length ***2,181 ft*** volume of fill ***2,853 cu yd***

Will spoils be disposed of on site? ☒ No ☒ Yes ➡ Show location of spoils on site plan if spoils disposed of on an upland area.)

Water elevation Reference datum used ☐ NGVD 29 ☒ NAVD 88 ☐ IGLD 85 (Great Lakes coastal areas) ☐ other

➡ Show elevation on plans with description.

Revised

COUNTY OF ST. CLAIR, MICHIGAN

BOB WILEY, DRAIN COMMISSIONER
21 AIRPORT DRIVE, ST. CLAIR, MICHIGAN 48079

PHONE: (810)-364-5369 FAX: (810) 364-7240

November 22, 2010

MDEQ
LWMD PCE
P.O. BOX 30204
Lansing, MI 48909-7704

Re: Gossman Drain Improvement
USACE/MDEQ Joint Permit Application
Project #: SCC-04-1228

Dear Sir/Madam:

As consulting engineers for the St. Clair County Drain Commissioner, Eric Ostling of Huron Cosnutlants, is authorized to act as my agent with respect to the Gossman Drain improvement project.

Please review this USACE/MDEQ Joint Permit Application for the improvements to be performed on the Gossman Drain.

Sincerely,

Robert Wiley
St. Clair County Drain Commissioner

Enclosure

Email:
rwiley@stclaircounty.org

Office Hours
Monday through Friday
8:00 a.m. to 4:00 p.m.

PROJECT NARRATIVE
USACE/MDEQ JOINT USE PERMIT APPLICATION
GOSSMAN DRAIN, ST. CLAIR COUNTY DRAIN COMMISSIONER

This project narrative is prepared as a supplement to the joint permit application, to provide project background, and to address and expand on matters too lengthy for the limited spaces provided in the application. The permit application file number 09-74-0061-P for this project was originally submitted in September, 2009. A public hearing was held January 7, 2010. The USEPA objected to the issuance of a permit on February 1, 2010. The MDNRE denied the permit on February 11, 2010. Negotiations between USEPA, MDNRE, and the applicant, St. Clair County Drain Commissioner Bob Wiley, took place between February 2010 to the present, to resolve issues as part of a contested case hearing. The contested case was withdrawn on September 10, 2010 to begin the permit process anew under this final scope of work.

SECTION 3.
PROPERTY OWNER INFORMATION

The Drain Commissioner has Right-of-Ways for the existing and proposed branches. Some easements have been obtained recently, for relocation of part of Branch 1 at Jospeh Pollina Subdivision, and establishment of Branches 2 & 3 in Old Farm Subdivision. Other easements date from the drain's original establishment in 1927. The easement documents are not included in this package, as these would involve over 100 pages. The documents can be provided if necessary. The Rights-of-Way widths are shown on the plans. A list of adjacent property owners impacted by the regulated portions of this project is attached for Section 8 of the application.

SECTION 4.
PROPOSED PROJECT PURPOSE, INTENDED USE AND ALTERNATIVES CONSIDERED

Proposed Project Purpose/Intended Use:

Proposed Chosen Project Alternative

Please refer to the plans to follow along with this project narrative. The Gossman Drain was originally established in 1927. The drainage system has been altered over time, including land development, two past petitioned drain projects, by the enlargement of the drainage district, etc.

The St. Clair County Drain Commissioner's office has correspondence from as early as 1981, documenting drainage problems in the Old Farm Subdivision. On May 15, 2002, the Charter Township of Fort Gratiot passed a resolution and submitted an Application for a New County Drainage District to solve flooding problems in Old Farm Subdivision. A preliminary engineering study was commissioned by the Drain Commissioner in response to that application and the study determined that best solution to Old Farm flooding problems was to extend the upper end of Branch 1 of the Gossman Drain west across State Road to provide an outlet for the Old Farm Subdivision storm water sewers and ditches. There were existing ditches that had once served this purpose of an outlet to the Gossman Drain, but they had deteriorated in function and no agency had clear jurisdiction to restore them. For many years, the township and the County Road Commission had tried to fix the drainage problems with limited maintenance work. Finally, both entities decided to request that the Drain Commissioner use his authority to fix the problem. On May 6, 2003, following the preliminary engineering study, the Road Commission filed a petition with the Drain Commissioner to extend the Gossman Drain to take surplus water from the county roads in Old Farm Subdivision. In accordance with the Drain Code, a public hearing was held on the necessity of the proposed project and a Board of Determination ruled that the project was necessary for the protection of public health on December 4, 2003. Subsequently, the scope of work has been designed, and easements obtained to make the proposed project possible.

SECTION 4.
PROPOSED PROJECT PURPOSE, INTENDED USE AND ALTERNATIVES CONSIDERED

Proposed Project Purpose/Intended Use: (continued)

The St. Clair County Drain Commissioner's office has put this plan together as one single and complete project for a one-time assessment to the drainage district. The project has been developed over the past six years, supported by public records concerning drainage problems that were supplied to the USEPA and MDNRE as part of the previous permit and negotiation process. Alternatives have been considered, to be expanded upon later in this report. The final chosen project scope is believed to be the least environmentally damaging practical alternative. The means and methods employed in the construction operations will avoid or limit adverse environmental impacts. Concessions have been made to mitigate some of the effects of the drainage project, such as in-line detention, and minimizing or eliminating some enclosures to mitigate for the necessary extension of other enclosures.

Field survey of the pre-existing county drain Main Branch and Branch 1, and proposed drain Branches 2 & 3, identified several areas of concern. On the Main Branch and Branch 1, the culverts at and around Parker Road require replacement and/or supplemental improvements. The St. Clair County Road Commission has safety standards that must be addressed, such as side slopes, headwalls to minimize lengths of culverts, and guardrails. Private crossings also require attention to culvert end treatment. Little else in the way of improvements has been proposed for the Main Branch, other than culvert improvements.

Hydraulic certifications of the proposed culverts will be provided for final approval of the permit application when it is certain that the design plans are permittable and subject to no further revisions. Normally, culverts and channels are designed to ultimately accommodate the 100-year storm event. The MESBOA Method is used as a guideline in designing proposed culverts:

- ✓ Match culvert width to bankfull stream width. However, this cannot always be accomplished.
- ✓ Extend culvert length through the side slope toe. Sometimes headwalls are required.
- ✓ Set culvert slope the same as stream slope. Some culverts must be steeper to convey flow.
- ✓ Bury the culvert 4 to 12 inches into the stream bottom. This is done where feasible.
- ✓ Offset multiple culverts. No multiple culverts proposed in this project.
- ✓ Align the Culvert with the stream channel. This is done on the Main Branch at Parker Road.

Because of the contested case negotiation process from the previous application, Branch 1 has been designed to incorporate certain environmental amenities, as well as the core engineering improvements. Culvert replacements have been designed for hydraulic improvements to accommodate flow from lands to be added to the drainage district, including the addition of, and improvements to, the proposed Branches 2 & 3. At the request of the MDNRE, in-line detention has been proposed along Branch 1 to provide detention of storm water from development upstream, including the Old Farm Subdivision, which was built before drainage detention was required for new developments.

At Joseph Pollina Subdivision, according to the plat of 1952, the drain was proposed to be relocated. However, the proposed relocation exhibited on the plat does not correlate with the field survey and the route & course of record. It is apparent that the drain was altered on each property independently to accommodate their site development. The channel slope, from the south line of the Joseph Pollina Subdivision, upstream to Pollina Avenue, is being returned to 0.20% as proposed in the 1960 construction plans.

SECTION 4.
PROPOSED PROJECT PURPOSE, INTENDED USE AND ALTERNATIVES CONSIDERED

Proposed Project Purpose/Intended Use: (continued)

At Dykeman Road, and the driveway just upstream, the existing culverts are to be replaced with larger diameter pipes to accommodate the design flows. The invert elevations must be lowered, to accommodate the required invert elevation upstream. Deepening the drain causes concern for the Road Commission. Safety standards dictate that the enclosures be extended. To prevent the hazard and maintenance of a deep open drain between the two enclosures, they are to be combined into one contiguous enclosure. To mitigate the extension of the contiguous enclosure, nine private crossings are to be eliminated through the lots in Joseph Pollina Subdivision. To provide the property owners use of their land, the drain will be re-aligned to side and rear lot lines. The existing drain will be filled, and the lots re-graded and provided positive drainage.

The alignment relocation causes sharper bends to be created at the lot corners, rather than the existing gradual bends. The MDNRE has requested armoring of the slopes to resist soil erosion. Cross-vane structures designed according to the "Rosgen" method for stream geomorphology are proposed to direct the flows to the center of the channel, entering and exiting the bends, to relieve stresses on the banks. The bends will be excavated deeper to create pools, which provide volume to accommodate the accumulation of sediment, which tends to create point bars on the inside banks at bends.

Lands to the north of Branch 1 are to be added to the Gossman Drain district because they do not adequately drain in their current district. The property at the north end of Pollina Avenue and north of Branch 1 is planned for development. As part of this development, the drainage from a subdivison further north would be routed through the planned development's storm drainage system. The outlet from that system will then accommodate gravity outflow, instead of a pump, which would have higher construction, operation and maintenance costs.

The relocation of the Branch 1 alignment continues upstream to Pollina Avenue. Vacated north of Dykeman Road, Pollina Avenue is a private drive requiring culvert replacement for access to the property. The increased diameter of the pipe and minimum requirement for cover governs the depth of the drain. Upstream of Pollina Avenue, there is no requirement for the continued additional depth in the drain. A series of step-pools will transition to the higher elevations, by using cross-vanes, designed by the "Rosgen" method for dimensions and spacing.

Upstream of the step pools, bankfull benches will be excavated to create in-line detention, as requested by the MDNRE to mitigate runoff volume from upstream. The 100-year design flows and required detention volume are derived from the DEQ Stormwater Management Guidebook (August 1999 revision) using the SCS Method. Design inflow versus the outflow accommodated by the channel and subsequent downstream culverts, determined the required detention volume for the storm runoff contributed by all of the lands upstream, including the Old Farm Subdivision.

The bankfull bench elevations in the channel are a function of the contributing watershed area for a 1.5-year storm event. The bankfull channel dimensions were corroborated through cross-checking the Regional Curves developed for the St. Clair County Drain Commissioner for just such purposes. The Regional Curves were developed by surveying reference reaches of pristine w[illegible] courses throughout St. Clair County, and creating a charted curve that predicts bankfull channel dimensions according to the contributing drainage areas.

8

SECTION 4.
PROPOSED PROJECT PURPOSE, INTENDED USE AND ALTERNATIVES CONSIDERED

Proposed Project Purpose/Intended Use: (continued)

The Regional Curve predictions were very close to the results of designing the low-flow channel according to 1.5-year flows, and the Manning's equation for open channel flow. Therefore, the Regional Curve bankfull channel dimensions are justified and should be considered reliable.

The channel upstream of Pollina Avenue is to be excavated matching the existing slope to State Road, where a culvert is impeded by about 1 foot of sediment in the channel. At State Road, the east side road ditch turns south. Two driveway crossings are to be replaced, extended in length to satisfy the dimensional requirements of the Road Commission. The inside bank slopes must be 1 on 3 maximum, and exterior banks and culvert end treatments must be 1 on 2 maximum.

Branch 2 will begin at State Road, the east side road ditch, where Branch 1 turns south. While Branch 1 is being excavated by approximately 1 foot, to promote the free flow for the previously discussed driveway culverts, the Branch 2 channel bottom will remain at the existing elevation. Riprap armor from the downstream end of the first culvert will armor the transition from Branch 2 down to the excavated Branch 1. The debris will be cleaned out of Branch 2, and the channel shaped accordingly, but not deepened. The first driveway culvert, and the State Road enclosure, each will have 36-inch diameter pipe replaced with 60x38-inch elliptical concrete pipe, equivalent to 48-inch diameter pipe. Matching the same rise as the existing culverts, increased flow capacity is gained without lowering the channel or raising the surface elevations.

Branch 2 west of State Road will be maintained as open drain. In the original 1965 design plans for the Old Farm Subdivision, the drainage ditches were to be graded at 0.10%. So, if the ditch were cleaned out at 0.10% from Branch 1 at State Road all the way to the terminus at the northwest corner of Old Farm Subdivision, that would be appropriate. However, field survey of the rear yard drainage ditches along Old Forge Drive, indicates the existing storm sewer lateral side drains in Old Farm Subdivision are too deep to be serviced by a 0.10% gradient. Therefore, the proposed grade of the open channel will be 0.05%, to maximize depth. To compensate, the channel dimensions will use the entire 20-feet wide existing drainage easement for the top of banks of the drainage ditch. Despite efforts, additional easements were not obtained from the adjacent property owners.

As stated previously, in the original 1965 design plans for the Old Farm Subdivision, the drainage ditches were to be graded at 0.10%, with 1 on 1.5 side slopes. On paper, that apparently was enough detail of the design to obtain approval for construction at that time. Easements 20 feet wide were provided on "Plat No. 3 of the Old Farm Subdivision" and "Plat No. 5 of the Old Farm Subdivision", through the rear yards along the northerly and easterly limits of the plats. Storm sewer pipe laterals run north/south through several side yards of homes from the road right-of-ways to the open rear yard drainage ditches, which are the proposed Branches 2 and 3.

Over 45 years, as the subdivision was built and grew, the home owners independently enclosed certain portions of the rear yard drainage ditches, graded the yards, erected sheds, play areas, pools, etc., without much oversight of the resulting drainage conditions. There are culverts of varying size and at varying elevations, that have caused the system to be hydraulically ineffi[illegible].

SECTION 4.
PROPOSED PROJECT PURPOSE, INTENDED USE AND ALTERNATIVES CONSIDERED

Proposed Project Purpose/Intended Use: (continued)

The banks of the ditches are too steep in many places and without stabilizing vegetative cover, due to heavy shade from forest cover. The topsoil, sandy and unstable, has sloughed off the banks into the bottom, exposing the tree roots, and clogging the culverts. Leaf litter from the mature tree canopy, grass clippings and yard waste further clog the system. The field survey clearly indicates culverts nearly full of debris. There are other culverts laid with no slope or reverse slope. All of this has led to blockage of the drainage and flooding in the subdivision.

At the northwest corner of the subdivision, there is a storm sewer lateral that is supposed to connect to the open rear yard ditch (Branch 2). The top of this pipe is lower than the bottom of the ditch and lower than the invert of the next culvert downstream in the ditch, which means this storm sewer lateral has no outlet. So there is flooding along the storm sewer upstream of that lateral. In order to provide free flow for this storm sewer, and all others, the outlet channel must be deeper. There are only 20-feet wide easements and it would be difficult and costly, if not impossible, to obtain wider easements in this residential situation. Excavating the open rear yard ditches to the elevation needed to uncover the buried storm sewer lateral while staying within the existing easement would result in some side slopes that would exceed 1 on 1.5, approaching 1 on 1. This is too steep to be maintained in a stable condition.

Obtaining a wider easement would be very difficult because most of the homes along Branch 2 and Branch 3 already have small back yards, which would be made even smaller by a wider open ditch. On the opposite side of the ditches from the homes are some pristine forested parcels. Obtaining easements from that side of the diitch might require condemnation and would be very disruptive to the picturesque, forested character of the neighborhood. One large parcel adjacent to a portion of Branch 3, is a nature sanctuary owned by the Thumb Land Conservancy and has a conservation easement on it, so no easement could likely be obtained for that location. Therefore, we propose that the system be mostly enclosed within the existing 20-feet wide easements. The contractor could then do the work in-line with the installation of the pipe, just as with any storm sewer system. Construction equipment could drive in and out of the work area over the enclosed pipe. This could not be done satifactorily in the open ditch, as the equipment would continously disturb the side slopes.

Enclosing the rear yard ditches will eliminate the soil erosion caused by the naturally unstable banks. After the yards have been restored and vegetation established, there will be little or no post-construction soil erosion to cause sedimentation in the pipes or downstream. When the system does need maintenance, cleaning of the pipes will be much easier than working in the difficult conditions of the open ditch. The property owners will not be able to dump grass clippings and leaves in the open ditch to clog the culverts. Fort Gratiot Township has a yard waste pick-up program and the Drain Commissioner will encourage landowners to participate. The Drain Commissioner will also have jurisdiction to ensure that pet waste and other pollutants aren't dumped into the drain.

According to current development standards, a 10-year storm event design is required for drainage systems through residential subdivisions. The Rational Method for drainage using Manning's equations for pipe hydraulic design methods was used to size the storm sewer. Enclosure on Branches 2 and 3 will begin at the east line of the Old Farm Subdivision. Branch 2 runs west and Branch 3 runs south along the east line of the plat.

SECTION 4.
PROPOSED PROJECT PURPOSE, INTENDED USE AND ALTERNATIVES CONSIDERED

Proposed Project Purpose/Intended Use: (continued)

The rear yards along the east plat line there are low-lying, so there is not enough cover for the 48-inch pipe required for the Branch 2 design flows. An elliptical concrete, or alternatively a steel pipe arch, will be required to keep the finished grades lower. Branch 2 has a confluence of side drains at the northeast corner of Old Farm Subdivision, and Branch 3 the same condition at the southeast corner. The drainage ditches will remain open at those locations.

Branches 2 and 3 will be enclosed for their full length upstream of those open corner portions to their respective points of terminus. Smooth Lined Corrugated Plastic Pipe (SLCPP) has been chosen for the project because of its hydraulic efficiency. SLCPP does withstand H-20 traffic loading, for use at any applicable private crossings along the enclosure. Some of the storm sewer laterals for the subdivision system require relacement. Some of these laterals were installed outside of the easements platted for them. The Drain Commissioner will relocate these laterals into the easements so there is legal access for future maintenance.

Cost estimates for the scope of work on the entire project up to the submittal of this permit application total $1,238,849.00.

"Pros" for the chosen project alternative include: 1) Comply with the Board of Determination order. 2) Provide a single and complete project targeting all of the improvements deemed most necessary and appropriate. 3) Minimizing and mitigating adverse environmental impacts by working only within the existing easements for the purposes of the Drain Commissioner's office. 4) Providing a stable and balanced drainage system that will require minimal future maintenance. 5) Satisfying property owners adjacent to Branches 2 and 3 who oppose the problematic and unsafe conditions of the open ditches.

"Cons" for the chosen project alternative include: 1) Cost of enclosure requires a relatively large up-front expenditure. 2) Backyards of residences will experience short term disruption. 3) Some open ditch habitat will be lost. 4) Some property owners adjacent to Branches 2 and 3 oppose changing the existing conditions.

Alternatives Considered:

As part of the previous permit application, and negotiations with the USEPA, MDNRE, and affected municipal and private stakeholders, several alternatives had been researched.

Alternative 1

The first alternative is to do nothing but essentially maintenance of the existing system. Existing culverts would be jet-cleaned and assessed for structural integrity, slip-lined for enhanced hydraulic capacity, or replaced in-kind if necessary, at the same location and elevation. The channels would be cleared of debris and obstructions removed. Any serious soil erosion will be re-graded and/or armored, to the extent possible within the 20-foot easement.

"Pros" for Alternative 1 include: 1) Least cost of construction. 2) Least disruption to the neighborhood. 3) Existing open ditch habitat would be maintained. 4) It would satisfy those property owners adjacent to Branches 2 and 3 who oppose changing the existing conditions.

SECTION 4.
PROPOSED PROJECT PURPOSE, INTENDED USE AND ALTERNATIVES CONSIDERED
Proposed Project Purpose/Intended Use: (continued)

"Cons" for Alternative 1 include: 1) Fails to comply with the Board of Determination order. 2) Some Main Branch and Branch 1 crossings would remain under-sized for the design flows. 3) Branch 2 storm sewer laterals would remain lower than downstream portions of the system, therefore sedimentation, blockages, and flooding problems would continue. 4) Many Branch 2 and 3 banks remain largely bare of vegetation, therefore the adverse environmental impact to the water quality due to soil erosion will continue. 5) Frequent maintenance and repair would need to be done on the system 6) Many property owners adjacent to Branches 2 and 3 oppose leaving the problematic and unsafe open ditches.

Alternative 2

The second alternative is to do the least amount of construction improvements necessary to upgrade the drain to current standards, including, but not necessarily limited to: the minimum safety requirements on major roads; structural integrity of culverts; and adequate conveyance of design flows.

At the very least, certain crossings on the Main Branch and Branch 1 should be replaced. The Parker Road crossings of the Main and Branch 1 are degrading, and in both cases the channels are deep with steep side slopes. Rather than lengthen the culverts to make the side slopes gradual, headwalls will be used to stabilize the ends and eliminate the erosion potential. Guardrails would be added for traffic safety.

The Main Branch improvements would also include replacement of the first two private crossings upstream of Parker Road, and concrete bag headwalls for the end treatments of the first three culverts, to avoid the need to lengthen those enclosures in order to obtain stable end slopes. Milton Road requires some grading and armor to address erosion potential at the culvert end slopes and the side drains of the Milton Road ditches.

The Branch 1 crossing downstream of Parker Road requires extension of the enclosure to satisfy the requirements for end treatment in order to have stable end slopes. Concrete bag headwalls are not being considered for this culvert due to the higher design flows and velocities,

and concrete block or alternative poured concrete head walls are too expensive. Upstream of Parker Road, Branch 1 meanders across large tracts of land, and then through the lots of Joseph Pollina Subdivision. There is a private crossing at each lot, and public crossings at Dykeman Road, and Pollina Avenue.

None these crossings would be removed or replaced, but the banks would require riprap armoring or another method of preventing erosion that is occurring there. Some excavation would be necessary to clean the drain and the culverts would be jet-cleaned, to promote positive drainage. Existing culverts are undersized for the design flows, and all seem to be installed at independent invert elevations and slopes, but excavating the channel to a consistent slope should improve drainage.

SECTION 4.
PROPOSED PROJECT PURPOSE, INTENDED USE AND ALTERNATIVES CONSIDERED

Alternatives Considered: (continued)

There are lands to the north of Branch 1 that are to be added to the Gossman Drain district, because the lands do not adequately drain in their own district. A gravity drainage system is proposed for a future development adjacent to the drain. This alternative does not include excavating the drain deeper to accommodate gravity flow, so a pump system would be required upon development. Upstream of Pollina Avenue to State Road, Branch 1 requires excavation of the low-flow channel to promote the free flow of water from the State Road culvert, which is currently partially impeded by sedimentation in the channel about 1 foot above the culvert invert.

Branch 2, beginning at the confluence with Branch 1, would be minimally excavated, and the existing culverts east of State Road jet-cleaned to promote positive drainage. West of State Road, Branch 2 would be cleared of debris and minimally excavated to the east line of Old Farm Subdivision. The existing culverts through the rear yards of Old Farm Subdivision along Branch 2 were installed independently, at varying sizes, slopes and invert elevations. As previously stated, the westernmost storm sewer lateral outlet of the subdivision's interior storm drainage system is completely buried. To promote positive drainage, the channel would have to be excavated by over 1 foot, and nearly all existing culverts replaced at lower elevations, with larger diameter pipes to convey the flows. Branch 3 also requires excavation, and the existing enclosure is undersized and requires jetcleaning.

As described above, there are currently platted 20-feet wide drainage easements for the rear yard ditches that are being established as Branch 2 and Branch 3. There is no room to work outside of these easements. On the subdivision side of the easements, there are homes, accessory structures, decks, patios, and other obstructions. Additional easement would have to be obtained on the opposite side of the plat lines. Even if the easements could be obtained, construction operations would cause long-term adverse environmental impact. A large swath of the mature trees would need to be cleared along the top of bank and side slope for the heavy equipment to work while excavating the ditches and replacing or lowering existing culverts.

If the construction operations were attempted without the benefit of the additional easement in which to work, equipment would be forced to track down the middle of the drainage ditches. The side slopes would be cleared of trees in order to accommodate the traffic. The transportation of materials and equipment up and down the ditch would tear the slopes apart, causing much soil erosion, and restoration would be very difficult. If the contractor had to move back into a restored area, the process of disturbance and restoration would repeat over and over again.

On certain lots, including the lot which contains the buried storm sewer lateral which governs the required excavation, excavating to the needed depth would create a very steep and unstable ditch bank. The original 1965 plans indicate that all drainage ditches, with 2-feet wide bottoms and 1 on 1.5 side slopes would fit within the provided 20-feet wide easements. This is misleading. The field survey and design work for this project shows that at some locations, there would be over 8 feet from the existing top of bank to the proposed bottom. With 20-feet wide easements, subtracting a 2-feet wide bottom leaves 18 feet, or 9 feet per side. Eight feet vertically over 9 feet horizontally would result in side slopes about 1 on 1.125, which is steeper than any conventional standards, especially considering the sandy, unstable soils onsite. The side slopes would be less stable than at their existing condition, and more prone to erosion, regardless of the use of erosion control mulch blanket.

SECTION 4.
PROPOSED PROJECT PURPOSE, INTENDED USE AND ALTERNATIVES CONSIDERED

Alternatives Considered: (continued)

"Pros" for Alternative 2 include: 1) Possibly less cost of construction than the chosen project, but possibly as much or more, given the difficulty of access. 2) Open ditch lineal wetland habitat would be left. 3) It would satisfy some property owners adjacent to Branches 2 and 3 who oppose the complete enclosure of the rear yard ditches.

"Cons" for Alternative 2 include: 1) Fails to comply with the Board of Determination order. 2) Some of the existing culverts would remain undersized for design flows. 3) Greater disruption of backyards in Old Farm Subdivision and more soil erosion than with laying one uniform pipe. 4) More short-term adverse environmental impact in clearing the strip of mature trees along the banks of Branches 2 and 3. The open rear-yard ditches in Old Farm would be disturbed by excavation and wouldn't return to a natural state for some time, and with the tree canopy removed, they would be a candidate for invasion by invasive purple loosestrife and *Phragmites*. 5) Public safety concerns because of the deep, steep sloped open ditches of Branches 2 and 3. 6) Open excavation of Branches 2 and 3 might require the purchase or condemnation of easements, which would be expensive and impractical. Easement acquisition including legal costs could be as high as $20,000 per easement. 7) A pumped drainage system would increase operation and maintenance costs for drainage of lands north of Branch 1, which are to be added to the district. 8) Many property owners adjacent to Branches 2 and 3 oppose leaving the problematic and unsafe open ditches, which would be even worse, where deepened.

Alternative 3

The third alternative includes, but may not be necessarily limited to: the proposed improvements from the chosen project alternative for the Main Branch and Branch 1 around the Parker Road and tailwater areas; the relocation of the Branch 1 channel alignment in the Joseph Pollina Subdivision; extending the contiguous open channel with the elimination of the 9 crossings in lieu of the required enclosure extension at Dykeman Road; the relocation of the Branch 1 alignment west of Pollina Avenue; the in-line detention between Pollina Avenue and State Road; excavating the channel west to State Road and replacing the Branch 1 State Road culverts.

The differences from the chosen project alternative are in regard to proposed Branches 2 & 3. The existing rear-yard drainage ditches would be left in their present conditions. To fix drainage and flooding problems, storm sewer would be installed along the platted streets in Old Farm Subdivision to take drainage from the subdivision away from the rear-yard ditches. The storm sewers would be installed along existing easements to a point on the east boundary of the subdivision at which Branches 2 & 3 would converge with the rear-yard ditches. This would bypass the worst obstructions and provide positive drainage for the rest of the subdivision.

The existing utilities within the St. Clair County standard 66-feet wide road right-of-ways in the subdivision would be in potential conflict. In order to provide the standard 10 feet of separation between storm sewer and other utilities, pavement would need to be disturbed and restored.

For Branch 2, gas main exists on the north side of Old Forge Drive and sanitary sewer exists on the east sides of East Surrey and Vineyard Lanes. The storm sewer would be installed on the road side of those utilities. Any service leads for these utilities, or the water main from the opposite sides of the roads, would be in potential conflict.

SECTION 4.
PROPOSED PROJECT PURPOSE, INTENDED USE AND ALTERNATIVES CONSIDERED

Alternatives Considered: (continued)

For Branch 3, there is an existing storm sewer along the south side of Surrey Lane that would be removed and replaced. The cost of this removal and replacement is nearly the same as the removal and replacement of the rear yard enclosure that would take place in the chosen alternative. However, with placing the storm sewer in the road, there would not be an open channel left as in Branch 3 at the southeast corner of the subdivision, so more pipe would be installed in the road right-of-way. There is still the potential for conflict with service leads from the gas, water and/or sanitary sewer in this area.

Separation from the other utilities would cause the storm sewer to be installed along the existing edge of pavement. At least half of the pavement lane would be removed to install the pipe. The roads would be further disturbed by the tracking of heavy equipment. If the destruction by the construction operations were kept in close check, at the very least the one full lane would be milled and resurfaced after the half-lane was rebuilt in restoration following pipe installation. All of the pavement removal and replacement would add considerable cost to the project.

Cost estimates for this scope of work of construction total $1,460,794.00, which is about $221,945.00 more than the costs estimated for the chosen project alternative. However, the costs to the residents due to the hardships that street construction would cause also need to be given consideration, though they are difficult to estimate. School bus traffic would be affected, as would garbage pickup and other community services.

Pros for Alternative 3 include: 1) Drainage of lands north of Branch 1 being added to the system would be accommodated with a gravity outlet. 2) Less short-term and long-term environmental impacts along the rear-yard drainage ditches, proposed Branches 2 and 3. 3) Easier access, operation and maintenance of the storm sewer in road right-of-ways, than with the rear yard drainage ditches. 4) It would satisfy some property owners adjacent to Branches 2 and 3 who oppose changing the existing conditions of the rear-yard drainage ditches.

Cons for Alternative 3 include: 1) Increased cost of construction to install Branches 2 and 3 storm sewer along streets rather than in rear yards. 2) There would be difficult-to-measure costs caused by the disruption of street access to homes and related public services. 3) New easements might be required for the storm sewer outlets on the east side of the subdivision 4) The rear yard drainage ditches would continue to function less than optimally, and further lack of maintenance may leave the culverts fully clogged. 5) Homeowners with sump pumps discharging to the rear yard ditches would need to re-route their sump pump lines 6) Any drainage that depends on the rear yard ditches, such as some drainage from lands north of Old Farm Subdivision, would worsen and the Drain Commissioner might face additional demands to restore that drainage 6) Property owners adjacent to Branches 2 and 3 that want to see the existing open ditches enclosed would continue to have the concerns they now have over safety, lack of maintenance, etc.

RECEIVED
OCT 1 2 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

SECTION 5.
LOCATING YOUR PROJECT SITE

The Gossman Drain improvement project covers various work areas in a relatively large area, and is accessible from numerous St. Clair County Roads and city roads that cross the drain at various points. Points of access are provided in the table below. Directions are provided from M-25/Pine Grove Avenue located in Fort Gratiot, Michigan, unless otherwise noted. The locations are shown in figures denoted by their respective work area letters from this table. The sheet numbers for each of these work areas are also provided.

Culvert Replacement and Low Flow Channel Excavation

Work Area No.	Branch	Station	Sheet No.	Site Location
1	Main Branch	06+00 to 11+20	3	From Pine Grove Avenue turn west onto North River Road. Follow North River Road for approximately 1 mile. Turn right (north) onto Parker Road and 1/3 mile thereon, the drain will be visible on either side of the road. Turn right (east) into driveway at 3750 Parker Road, the work area extends for 520 feet west, upstream along the drain.
2	Branch 1	105+00 to 107+00	7	From Work Area 1, 330 ft north on Parker Road, the drain will be visible on either side of the road. Turn right (east) into a driveway located at 3766 Parker Road, the work area extends for 125 feet east, downstream, and 75 feet west, upstream along the drain.
3	Branch 1	122+00 to 136+50	8	From Work Area 2, 660 ft north on Parker Road. Turn left (west) on Dykeman Road, and 1/3 of a mile thereon, the drain will be visible on either side of the road. Turn right (north) into a driveway located at 3740 Dykeman Road, the work area extends for 800 feet southeast, downstream, and 650 feet northwest, upstream along the drain.
4	Branch 1	136+50 to 148+00	9	From Work Area 3, 660 ft west on Dykeman Road to Pollina Road, turn right (north), 165 feet to dead end, the drain will be visible on either side of the road. The work area extends for 1150 feet west, upstream along the drain.
5	Branch 1	148+00 to 158+00	10	From Work Area 4, 1/2 of a south to North River Road, turn right (west), 1/4 of a mile to Grant Avenue, turn right (north), 1/2 of a mile to the dead end. Park at 3815 or 3818 Grant Avenue. Drain runs through rear yards. The work area extends for 500 feet east, downstream, and 500 feet west, upstream along the drain.
6	Branch 1	158+00 to 169+00	10-11	From Work Area 5, 1/2 of a south to North River Road, turn right (west), 1/4 of a mile to State Street, turn right (north), 1/2 of a mile, drain will be visible on either side of the road. Turn right (east) into a driveway located at 3780 State Road. The work area extends for 600 feet east, downstream, and 300 feet south, upstream along the east side road ditch.
7	Branch 2	200+00-206+00	12	From Work Area 6, follow east side road ditch north, and west across State Road, the work area extends for 400 feet west, upstream along the drain.
8	Branch 2	206+00 to 242+10	12-14	From Work Area 7, south 1/2 mile to North River Road, turn right (west), 1/2 mile to Angus Road, turn right (north) 1/2 mile to Old Forge Dr. intersection, turn right (east) onto Old Forge Drive for 1000 ft. until East Surrey Lane intersection. Turn left (north) into driveway at 4100 Old Forge Drive The drain will be visible at the back of the property, 140 feet from the road. The work area extends for 850 feet south and east, downstream, and 2,750 feet west, upstream along the drain along the rear yards of the residences along Old Forge Drive.
9	Branch 3	300+00 to 312+00	15	From Work Area 7, the intersection of Old Forge Drive and East Surrey Lane, south on East Surrey Lane 660 feet to the Surrey lane intersection. Turn southeast into driveway at 3674 East Surrey Lane. The drain will be visible at the back of the property, 130 feet from the road; the work area extends for 325 feet north, downstream, and 850 feet west and south, upstream along the drain along the rear yards of the residences along East Surrey Lane, Surrey Lane and Vinyard Lane.

SECTION 8
ADJACENT/RIPARIAN AND IMPACTED OWNERS
USACE/MDEQ JOINT USE PERMIT APPLICATION
GOSSMAN DRAIN, ST. CLAIR COUNTY DRAIN COMMISSIONER

RECEIVED
OCT 12 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

No	Property Owner's Name	Parcel No.	Mailing Address	City	State	Zip Code
		MAIN BRANCH				
1.	FRANCIS BRAD M	74-20-495-4004-000	3400 LOMAR DR	Fort Gratiot	MI	48059
2.	WALKE JOHN/DENISE	74-20-495-0005-000	3430 LOMAR DR	Fort Gratiot	MI	48059
3.	KUDZIA SUSAN	74-20-028-1046-000	3740 PARKER RD	Fort Gratiot	MI	48059
4.	KOLMAN EDWARD/MYRTLE	74-20-028-1047-000	3750 PARKER RD	Fort Gratiot	MI	48059
5.	HARPER ROSEMARY	74-20-029-2015-000	3741 PARKER RD	Fort Gratiot	MI	48059
6.	BLACK BRYAN/TINA	74-20-029-3003-000	3709 PARKER RD	Fort Gratiot	MI	48059
7	STOKAN DAVID/LINDA	74-20-029-3004-000	3701 PARKER RD	Fort Gratiot	MI	48059
8.	CRIMMINS LEO ET AL	74-20-029-3005-000	3685 PARKER RD	Fort Gratiot	MI	48059
		BRANCH 1				
9.	HOUSEHOLD FINANCE CORP III	74-20-029-2014-000	961 WEIGEL DR	Elmhurst	IL	60126
10.	PRO-TEL DEVELOPMENT	74-20-029-3010-001 74-20-029-1013-001	4800 MELDRUM RD	Casco	MI	48064
11.	DONNENWORTH T/S	74-20-631-0001-000	3625 DYKEMAN RD	Fort Gratiot	MI	48059
12.	LAVERE DELORES	74-20-631-0002-000	3633 DYKEMAN RD	Fort Gratiot	MI	48059
13.	WELCH YVONNE	74-20-631-0003-000	3639 DYKEMAN RD	Fort Gratiot	MI	48059
14.	DELANO DANIEL D	74-20-631-0004-000	3659 DYKEMAN RD	Fort Gratiot	MI	48059
15.	CAMPBELL JAMES JR/P	74-20-631-0005-000	3667 DYKEMAN RD	Fort Gratiot	MI	48059
16.	ERNST FREDERICK/DEBRA	74-20-631-0006-000	3679 DYKEMAN RD	Fort Gratiot	MI	48059
17.	GWISDALA MARK J	74-20-631-0007-000	3701 DYKEMAN RD	Fort Gratiot	MI	48059
18.	BOYNE WESLEY/DEBORAH	74-20-631-0008-000	3709 DYKEMAN RD	Fort Gratiot	MI	48059
19.	NELSON MATT/JENNIFER	74-20-631-0020-000	3708 DYKEMAN RD	Fort Gratiot	MI	48059
20.	THOMPSON MICHELLE	74-20-631-0019-000	1966 MEADOWLARK LN	Kimball	MI	48074
21	PAPINEAU ROBERT/THERESA	74-20-631-0018-000	3740 DYKEMAN RD	Fort Gratiot	MI	48059
22.	SNOWDEN DOUGLAS/DEBORAH	74-20-631-0017-000	3744 DYKEMAN RD	Fort Gratiot	MI	48059
23.	SCHOTT RICHARD/DARLENE	74-20-631-0016-000	3768 DYKEMAN RD	Fort Gratiot	MI	48059
24.	LOVIK CORA M	74-20-631-0015-000	3796 DYKEMAN RD	Fort Gratiot	MI	48059
25.	GAFFNEY THOMAS/KAREN	74-20-967-0008-000	3810 GRANT AVE	Fort Gratiot	MI	48059
26.	SEPPO THOMAS/BRENDA	74-20-967-0009-000	3818 GRANT AVE	Fort Gratiot	MI	48059
27	STOTZKE LAWRENCE/THERESA	74-20-967-0010-000	3815 GRANT AVE	Fort Gratiot	MI	48059
28.	NURNBERG CHARLES/MELODY	74-20-967-0011-000	3809 GRANT AVE	Fort Gratiot	MI	48059
29.	ERBE CHARLES	74-20-610-0009-000	3780 STATE RD	Fort Gratiot	MI	48059
30.	MORRIS TAMARA	74-20-029-1018-001	3776 STATE RD	Fort Gratiot	MI	48059
31.	CHENOSKI RAYMOND/HELEN	74-20-610-0008-000	3770 STATE RD	Fort Gratiot	MI	48059
32.	RICHARD MICHAEL/PERRY MARY	74-20-610-0007-000	3766 STATE RD	Fort Gratiot	MI	48059

SECTION 8
ADJACENT/RIPARIAN AND IMPACTED OWNERS
USACE/MDEQ JOINT USE PERMIT APPLICATION
GOSSMAN DRAIN, ST. CLAIR COUNTY DRAIN COMMISSIONER

No	Property Owner's Name	Parcel No.	Mailing Address	City	State	Zip Code
		BRANCH 2				
33.	LESLIE JAMES E/ VIRJEAN	74-20-029-1019-500	3810 STATE RD	Fort Gratiot	MI	48059
34.	HEMBROFF RONALD/ PAMELA	74-20-029-1019-700	3820 STATE RD	Fort Gratiot	MI	48059
35.	NELSON GAIL/ JANICE ET AL	74-20-029-1019-600	3838 STATE RD	Fort Gratiot	MI	48059
36.	FERRIER JOANN /POLLINA BETTY	74-20-030-2005-000	3187 WADHAMS RD	North Street	MI	48049
37.	SCHULTZ RICHARD	74-20-030-2006-000	3815 STATE RD	Fort Gratiot	MI	48059
38.	STEIN FRANK/DEBORAH	74-20-030-2007-000	3950 KRAFFT RD	Fort Gratiot	MI	48059
39.	RICHARDS WADE/JANICE	74-20-589-0058-000	3694 E SURREY LN	Fort Gratiot	MI	48059
40.	DICICCIO DOUGLAS A/RUTH A	74-20-589-0059-000	3700 E SURREY LN	Fort Gratiot	MI	48059
41.	CARFORE DENNIS/LINDA	74-20-589-0060-000	3708 E SURREY LN	Fort Gratiot	MI	48059
42.	HAYES MICHAEL/ANTOINETTE	74-20-050-0001-100	4098 OLD FORGE DR	Fort Gratiot	MI	48059
43.	MUELLER CARL/MICHELLE	74-20-050-0001-200	4100 OLD FORGE DR	Fort Gratiot	MI	48059
44.	FORT GRATIOT MICHIGAN LLC	74-20-589-0061-000	3692 NORTH RIVER RD	Fort Gratiot	MI	48059
45.	EVERITT DAVID/DONNA	74-20-589-0062-000	4116 OLD FORGE DR	Fort Gratiot	MI	48059
46.	JOKIE AMY S	74-20-589-0063-000	4126 OLD FORGE DR	Fort Gratiot	MI	48059
47.	WEDYKE DAVID H	74-20-589-0065-000	4112 OLD FORGE DR	Fort Gratiot	MI	48059
48.	KREMER CLARK/KATHLEEN	74-20-589-0066-000	4144 OLD FORGE DR	Fort Gratiot	MI	48059
49.	BAUER GEORGE JR TRUST	74-20-589-0067-000	4150 OLD FORGE DR	Fort Gratiot	MI	48059
50.	STRANEY RICHARD W	74-20-589-0068-000	4156 OLD FORGE DR	Fort Gratiot	MI	48059
51.	KOOPMAN JEFFREY F	74-20-589-0069-000	4162 OLD FORGE DR	Fort Gratiot	MI	48059
52.	RAWLINGS PATRICK/SUE TRUST	74-20-589-0070-000	4168 OLD FORGE DR	Fort Gratiot	MI	48059
53.	OSWALD MICHAEL/SANDRA	74-20-589-0071-000	4174 OLD FORGE DR	Fort Gratiot	MI	48059
54.	FIEBELKORN ROCKNE L/ALANA S	74-20-589-0072-000	4180 OLD FORGE DR	Fort Gratiot	MI	48059
55.	TRAMSKI DOUGLAS E/LISA M	74-20-589-0073-000	4188 OLD FORGE DR	Fort Gratiot	MI	48059
56.	STANLEY JAMES/ROMYLTA	74-20-589-0074-000	4194 OLD FORGE DR	Fort Gratiot	MI	48059
57.	COOPER MICHAEL E/REBECCA J	74-20-589-0075-000	4200 OLD FORGE DR	Fort Gratiot	MI	48059
58.	ROOT BRIAN K/SARAH J	74-20-589-0076-000	4206 OLD FORGE DR	Fort Gratiot	MI	48059
59.	LICK MICHELLE A	74-20-589-0077-000	4214 OLD FORGE DR	Fort Gratiot	MI	48059
60.	STOCKWELL BART II/KRISTY	74-20-589-0078-000	4222 OLD FORGE DR	Fort Gratiot	MI	48059
61	BURGETT RANDALL F	74-20-589-0079-000	4228 OLD FORGE DR	Fort Gratiot	MI	48059
62.	HOUSING AND URBAN DEVELOPMENT	74-20-589-0080-000	50 LOUIS NW	Grand Rapids	MI	49503
63.	HORAK ROBERT G/DAWN M	74-20-589-0081-000	4242 OLD FORGE DR	Fort Gratiot	MI	48059
64.	KURTZ KIMBERLY/ LEWANDOWSKI M	74-20-589-0082-000	4250 OLD FORGE DR	Fort Gratiot	MI	48059
65.	JOHNSON JAMES/LOIS	74-20-589-0083-000	4256 OLD FORGE DR	Fort Gratiot	MI	48059
66.	MAGGS DAVE/STEPHANIE	74-20-589-0084-000	4262 OLD FORGE DR	Fort Gratiot	MI	48059
67.	SHAMALY MARGUERITE M	74-20-589-0085-000	4272 OLD FORGE DR	Fort Gratiot	MI	48059
68.	HILBRANDT DAVID/SARAH	74-20-589-0086-000	4280 OLD FORGE DR	Fort Gratiot	MI	48059
69.	WARD RICHARD/MARIAN	74-20-589-0087-000	4288 OLD FORGE DR	Fort Gratiot	MI	48059
70.	HAWLEY SCOTT/SUSAN	74-20-589-0088-000	4294 OLD FORGE DR	Fort Gratiot	MI	48059

SECTION 8
ADJACENT/RIPARIAN AND IMPACTED OWNERS
USACE/MDEQ JOINT USE PERMIT APPLICATION
GOSSMAN DRAIN, ST. CLAIR COUNTY DRAIN COMMISSIONER

No	Property Owner's Name	Parcel No.	Mailing Address	City	State	Zip Code
71.	FORRESTER DEAN E/PATRICE	74-20-589-0089-000	4300 OLD FORGE DR	Fort Gratiot	MI	48059
72.	TRETHEWAY GERALD/DORALEE	74-20-589-0090-000	4308 OLD FORGE DR	Fort Gratiot	MI	48059
73.	ADAIR STEVEN R/MISTY L	74-20-589-0091-000	4316 OLD FORGE DR	Fort Gratiot	MI	48059
74.	KAMIDOI STEVE/SUZANNE	74-20-589-0092-000	4324 OLD FORGE DR	Fort Gratiot	MI	48059
75.	BARTLEY VURN JR/BARBARA	74-20-589-0093-000 74-20-030-1009-000 74-20-030-1010-250	4332 OLD FORGE DR	Fort Gratiot	MI	48059
76.	KOLAR DENNIS/SALLY	74-20-587-0005-000	4338 OLD FORGE DR	Fort Gratiot	MI	48059
77.	VINCENT DONALD/BEVERLY	74-20-587-0004-000	4342 OLD FORGE DR	Fort Gratiot	MI	48059
78.	DROUILLARD STEPHEN/DEBRA	74-20-030-1012-000	4321 KRAFFT RD	Fort Gratiot	MI	48059
79.	WESTON GARY	74-20-030-1014-000	5373 LAPEER RD	Kimball	MI	48074
80.	MATHEWS JOHN/LORIE	74-20-030-1015-000	4265 KRAFFT RD	Fort Gratiot	MI	48059
81.	KUEHN JIM/RUTH	74-20-170-0001-000	4241 KRAFFT RD	Fort Gratiot	MI	48059
82.	KRAFFT ROAD PROP MANAGEMENT	74-20-170-0002-000 74-20-170-0003-000	316 MCMORRAN BLVD	Port Huron	MI	48060
83.	WUCHTE MATTHEW/ ALDERMAN SUSAN	74-20-170-0006-000	3326 SHOREWOOD	Fort Gratiot	MI	48059
	BRANCH 3					
84.	THUMB LAND CONSERVANCY	74-20-030-2009-000	4975 MAPLE VALLEY RD	Marlette	MI	48453
85.	JEX BRIAN C/TERESA	74-20-589-0049-000	3686 E SURREY LN	Fort Gratiot	MI	48059
86.	TODD MICHAEL/RENE	74-20-589-0048-000	3680 E SURREY LN	Fort Gratiot	MI	48059
87.	ARNOLD WILLIAM/PATRICIA	74-20-589-0047-000	3674 E SURREY LN	Fort Gratiot	MI	48059
88.	CARRIER JOHN S H/W CARRIER LORI	74-20-589-0046-000	4115 SURREY LN	Fort Gratiot	MI	48059
89.	KOVAR RICHARD/ANNA	74-20-589-0045-000	4121 SURREY LN	Fort Gratiot	MI	48059
90.	CATLOS PETER/ANGELENE	74-20-589-0044-000	4127 SURREY LN	Fort Gratiot	MI	48059
91.	MOORE THOMAS/CHRISTINE	74-20-589-0043-000	4133 SURREY LN	Fort Gratiot	MI	48059
92.	DUNKLE WILLIAM/MARY ANN	74-20-589-0042-000	4145 SURREY LN	Fort Gratiot	MI	48059
93.	LENDEL GLENN/NICOLE	74-20-589-0040-000	3660 VINEYARD LN	Fort Gratiot	MI	48059
94.	DUGAN JOHN/MICHELE	74-20-589-0039-000	4141 QUAKER HILL DR	Fort Gratiot	MI	48059

~~0-74-0001-P~~ Gossman Drain

St. Clair County Drain Commissioner
Section 10 Projects Impacting Wetlands or Floodplains

Revised

11/15/2010

Item	Station	Length (ft)	Avg. Depth (ft)	Width Bottom (ft)	Side Slope (ft)	Width Top (ft)	Area (sft)	Volume (cyd)
A. Projects Requiring Fill in Floodplain								
Branch 1								
C-1 (Add 30')	105+46	30	4.30	5.0	2.0	22.2	58	65
C-2 (Remove 4')	106+35	-4						
C-3 (Remove 17')	124+61	-17						
C-4 (Remove 15')	125+57	-15						
C-5 (Remove 18')	126+36	-18						
C-6 (Remove 20')	126+98	-20						
Fill channel	122+46-127+96	550	4.30				44	896
C-7 (Add 50')	129+22	50	4.30	4.0	1.5	16.9	45	83
C-8 (Add 90')	131+02	90	4.30	4.0	1.5	16.9	45	150
Fill channel	132+00-136+55	455					38	640
C-10 (Remove 9')	133+83	-9						
C-13 (Relocated)	136+69							
Fill channel	136+50-141+00	450					30	500
C-14 (Add 20')	164+62	20	2.75	0.0	2.0	11.0	15	11
C-15 (Add 20')	167+12	20	2.75	0.0	2.0	11.0	15	11
Branch 2								
C-16 (Add 10')	200+33	10	3.25	3.0	2.0	16.0	31	11
C-17 (Add 5')	202+07	5	3.25	3.0	2.0	16.0	31	6
C-17A	211+61	320	3.25	2.0	2.0	15.0	28	327
C-18 (Add 149')	215+66	149	4.30	2.0	2.0	19.2	46	252
C-19 (Add 51')	218+43	51	4.30	2.0	2.0	19.2	46	86
C-20 (Add 303')	219+27	303	4.30	2.0	2.0	19.2	46	512
C-21 (Add 307')	225+91	307	4.30	2.0	2.0	19.2	46	518
C-22 (Add 154')	231+28	154	4.30	2.0	2.0	19.2	46	260
C-24 (Add 39')	237+06	39	4.30	2.0	2.0	19.2	46	66
Branch 3								
C-25 (Add 633')	306+35	633	2.75	2.0	2.0	13.0	21	484
Main Branch								
C-26 (Add 4')	006+47	4	4.30	4.0	1.5	16.9	45	7
C-27 (Add 1')	009+53	1	4.30	4.0	1.5	16.9	45	2
C-28 (Add 1')	010+49	1	4.30	4.0	1.5	16.9	45	2
C-29 (No change)	011+10	0						
C-30 (No change)	017+75	0						
C-31 (No change)	021+86	0						
Total Fill within Floodplain								4888
B. Projects Requiring Dredging or Excavation in Floodplain								
Branch 1								
Realign channel	PR 00+00-07+17	717	3.01	4.0	2.0	16.0	16	412
Gabion channel	131+20-132+00	80	3.89	7.2		9.2	42	124
Realign channel	PR 00+00-05+13	513	2.98	4.0	2.0	15.9	16	310
Riffle	PR 06+10-07+50	140	3.18	3.0	2.0	15.7	30	154
Bankfull Bench	PR 07+50-10+82	332	2.05	67.8	2.0	76.0	147	1901
Bankfull Bench	142+00-151+00	900	2.05	67.8	2.0	76.0	147	5154
Bankfull Bench	151+00-155+50	450	2.05	43.8	2.0	52.0	98	1757
Bankfull Bench	155+50-163+85	835	2.05	67.8	2.0	76.0	147	4772
Low Flow Channel	163+50-164+42	92	3.18	0.0	2.0	20.0	32	108
Branch 2								
Excavate channel	202+45-209+97	752	0.77	5.0	1.5	20.0	20	557
Excavate channel	213+25-214+60	135	0.50	2.0	1.5	20.0	15	75
Branch 3								
Excavate channel	302+20-305+00	280	1.00	2.0	1.5	20.0	11	114
Total Dredge or Excavation in Floodplain								15439

~~0-74-0001~~P Gossman Drain

St. Clair County Drain Commissioner
Section 10 Projects Impacting Wetlands or Floodplains

Revised

11/15/2010

Item	Station	Length (ft)	Avg. Depth (ft)	Width Bottom (ft)	Side Slope (ft)	Width Top (ft)	Area (sft)	Volume (cyd)
A. Projects Requiring Fill Below OHWM								
Branch 1								
C-1 (Add 30')	105+46	30	1.34	5.0	2.0	10.4	10	11
C-2 (Remove 4')	106+35	-4						
C-3 (Remove 17')	124+61	-17						
C-4 (Remove 15')	125+57	-15						
C-5 (Remove 18')	126+36	-18						
C-6 (Remove 20')	126+98	-20						
Fill channel	122+46-127+96	550	1.28				44	896
C-7 (Add 50')	129+22	50	1.28	4.0	1.5	7.8	8	14
C-8 (Add 90')	131+02	90	1.28	4.0	1.5	7.8	8	25
Fill channel	132+00-136+55	455					38	640
C-10 (Remove 9')	133+83	-9						
C-13 (Relocated)	136+69							
Fill channel	136+50-141+00	450					14	233
C-14 (Add 20')	164+62	20	1.13	0.0	2.0	4.5	3	2
C-15 (Add 20')	167+12	20	1.13	0.0	2.0	4.5	3	2
Branch 2								
C-16 (Add 10')	200+33	10	1.13	3.0	2.0	7.5	6	2
C-17 (Add 5')	202+07	5	1.13	3.0	2.0	7.5	6	1
C-17A	211+61	320	1.13	2.0	2.0	6.5	5	57
C-18 (Add 149')	215+66	149	1.13	2.0	2.0	6.5	5	27
C-19 (Add 51')	218+43	51	1.13	2.0	2.0	6.5	5	9
C-20 (Add 303')	219+27	303	1.13	2.0	2.0	6.5	5	54
C-21 (Add 307')	225+91	307	1.13	2.0	2.0	6.5	5	55
C-22 (Add 154')	231+28	154	1.13	2.0	2.0	6.5	5	27
C-24 (Add 39')	237+06	39	1.13	2.0	2.0	6.5	5	7
Branch 3								
C-25 (Add 633')	306+35	633	1.13	2.0	2.0	6.5	5	113
Main Branch								
C-26 (Add 4')	006+47	4	1.13	4.0	1.5	7.4	6	1
C-27 (Add 1')	009+53	1	1.13	4.0	1.5	7.4	6	0
C-28 (Add 1')	010+49	1	1.13	4.0	1.5	7.4	6	0
C-29 (Riprap only)	011+10	0						
C-30 (No change)	017+75	0						
C-31 (Riprap only)	021+86	0						
Total Fill Below OHWM								2178
B. Projects Requiring Dredging or Excavation Below OHWM								
Branch 1								
Realign channel	PR 00+00-07+17	717	1.28	4.0	2.0	9.1	8	223
Gabion channel	131+20-132+00	80	1.28	7.2		7.2	9	27
Realign channel	PR 00+00-05+13	513	1.28	4.0	2.0	9.1	8	160
Riffle	PR 06+10-07+50	140	1.27	3.0	2.0	8.1	7	36
Bankfull Bench	PR 07+50-10+82	332	1.13	3.0	3.0	9.8	7	89
Bankfull Bench	142+00-151+00	900	1.13	3.0	3.0	9.8	7	241
Bankfull Bench	151+00-155+50	450	1.13	3.0	3.0	9.8	7	120
Bankfull Bench	155+50-163+85	835	1.13	3.0	3.0	9.8	7	223
Low Flow Channel	163+50-164+42	92	1.13	0.0	3.0	6.8	4	13
Branch 2								
Excavate channel	202+45-209+97	752	1.13	5.0	1.5	8.4	8	211
Excavate channel	213+25-214+60	135	1.13	2.0	1.5	5.4	4	21
Branch 3								
Excavate channel	302+20-305+00	280	1.13	2.0	1.5	5.4	4	43
Total Dredge or Excavation Below OHWM								1407

Revised

Item	Station	Total Riprap Length (ft)	Width (ft)	Depth (ft)	Area (syd)	Volume (cyd)	Riprap waterward of OHWM Length (ft)	Width (ft)	Depth (ft)	Area (syd)	Volume (cyd)	Riprap landward of OHWM Length (ft)	Width (ft)	Depth (ft)	Area (syd)	Volume (cyd)
C. Projects Requiring Riprap																
Branch 1																
C-1, 48"RCP Inlet & Outlet	105+46	54	10	1.3	60	27	54	8	1.3	48	21	54	2	1.3	12	5
C-2, 48" RCP Inlet & Outlet	106+35	24	30	1.3	80	35	24	8	1.3	21	9	24	22	1.3	59	26
Pr. Drain Re-alignment Bend	Pr. 00+30 - 00+60	30	20	1.3	65	29	30	8	1.3	27	12	30	12	1.3	38	17
Pr. Drain Re-alignment Bend	Pr. 05+14 - 05+46	32	21	1.3	75	33	32	8	1.3	28	13	32	13	1.3	46	20
C-7, 48"RCP Outlet	129+22	50	10	1.3	56	25	50	8	1.3	44	20	50	2	1.3	11	5
C-8, 48"RCP Inlet	131+02	50	10	1.3	56	25	50	8	1.3	44	20	50	2	1.3	11	5
Gabion Basket Walls	131+20-132+00	188	3	7.5	63	157	188	3	2.0	63	42	188	3	5.5	63	115
Pr. Drain Re-alignment Bend	Pr. 01+40 - 01+82	32	21	1.3	75	33	32	8	1.3	28	13	32	13	1.3	46	20
C-13, 48"RCP Inlet & Outlet	136+69	92	11	1.3	112	50	92	8	1.3	82	36	92	3	1.3	31	14
Cross-vanes at Riffle	Pr. 06+54 - 07+50	120	2.5	2.5	33	28	120	2.5	2.5	33	28	120	0	2.5	0	0
Restricted Channel Armor	Pr. 07+33 - 07+50	33	11	1.3	40	18	33	0	1.3	0	0	33	11	1.3	40	18
Branch 2																
C-16, 60"x38"RCP Inlet & Outlet	200+33	58	13	1.3	84	37	58	8	1.3	52	23	58	5	1.3	32	14
C-17, 60"x38"RCP Inlet & Outlet	202+07	58	13	1.3	84	37	58	8	1.3	52	23	58	5	1.3	32	14
C-17A, 60"x38"RCP Inlet & Outlet	211+61	58	13	1.3	84	37	58	8	1.3	52	23	58	5	1.3	32	14
C-18, 48"SLCPP Outlet	214+60	28	10	1.3	31	14	28	8	1.3	25	11	28	2	1.3	6	3
CB-7, 12"SLCPP Inlet	220+37	9	5	0.7	5	1	9	5	0.7	5	1	9	0	0.7	0	0
CB-23, 12"SLCPP Inlet	241+01	9	5	0.7	5	1	9	5	0.7	5	1	9	0	0.7	0	0
Branch 3																
C-25, 30"SLCPP All Inlets & Outlets	306+35	71	7	0.7	55	12	71	7	0.7	55	12	71	0	0.7	0	0
Main Branch																
C-26 Inlet & Outlet	006+47	24	30	1.3	80	35	24	8	1.3	21	9	24	22	1.3	59	26
C-27 Inlet & Outlet	009+53	34	8	1.3	30	13	34	8	1.3	30	13	34	0	1.3	0	0
C-28 Inlet & Outlet	010+49	34	8	1.3	30	13	34	8	1.3	30	13	34	0	1.3	0	0
C-29 Inlet & Outlet	011+10	34	8	1.3	30	13	34	8	1.3	30	13	34	0	1.3	0	0
C-31 Inlet & Outlet	021+86	34	16	1.3	60	27	34	8	1.3	30	13	34	8	1.3	30	13
Side Drain	042+13	15	6	0.7	10	2	15	6	0.7	10	2	15	0	0.7	0	0
Grand Totals:					1303 syd	703 cyd				817 syd	372 cyd				549 syd	331 cyd

Note:
Plain Riprap 8" min.
Heavy Riprap 16" min.

USACE/MDEQ Joint Use Permit Application
Gossman Drain, St. Clair County Drain Commissioner
Section 14. Bridges and Culverts

09/10/2010

		Existing					Proposed					
Crossing No.	C/L Location	Use	Length (ft)	Size	Type	Project Status	Length (ft)	Size	Type	New Culvert Recess	New Inlet End Treatment	New Outlet End Treatment
Branch 1												
C-1	105+46	Private	10	48"	CMP	Replace	40	48"	CMP	N/A	Riprap	Riprap
C-2	106+35	Primary Public	60	48"	CMP	Replace	56	48"	CMP	N/A	Concrete Headwall & Riprap	Concrete Headwall & Riprap
C-3	124+61	Private	17	36"	CMP	Remove	0		-	-	-	-
C-4	125+57	Private	15	36"	CMP	Remove	0		-	-	-	-
C-5	126+36	Private	18	36"	CMP	Remove	0		-	-	-	-
C-6	126+98	Private	20	36"	CMP	Remove	0		-	-	-	-
C-7	129+22	Local Public	166	48"	CMP	Replace	216	48"	RCP	4"	Riprap	Riprap
C-8	131+02	Private	22	36"	CMP	Replace	112	48"	RCP	4"	Riprap	Riprap
C-9	132+80	Private			Bridge	Remove	0		-	-	-	-
C-10	133+83	Private	9	42"	CMP	Remove	0		-	-	-	-
C-11	134+41	Private			Bridge	Remove	0		-	-	-	-
C-12	135+44	Private			Bridge	Remove	0		-	-	-	-
C-13	136+69	Local Public	27	48"	CMP	Replace	104	48"	RCP	4"	Riprap	Riprap
C-14	164+62	Private	20	30"	CMP	Replace	40	30"	CMP	N/A	Grade Banks	Grade Banks
C-15	167+12	Private	20	30"	CMP	Replace	40	30"	CMP	N/A	Grade Banks	Grade Banks
Branch 2												
C-16	200+33	Private	30	36"	CMP	Replace	40	60"x38"	RCPA	6"	Riprap	Riprap
C-17	202+07	Primary Public	115	36"	CMP	Replace	120	60"x38"	RCPA	6"	Riprap	Riprap
C-17-A	211+61	Private	0				320	60"x38"	RCPA	6"	Riprap	Riprap
C-18	215+66	Private	216	30"	CMP	Replace	365	48"	SLCPP	N/A	None	Riprap
C-19	218+43	Private	24	24"	CMP	Replace	75	48"	SLCPP	N/A	None	None
C-20	219+27	Private	82	24"	CMP	Replace	385	48"	SLCPP	N/A	None	None
C-21	225+91	Private	458	24"	CMP	Replace	765	48"	SLCPP	N/A	None	None
C-22	231+28	Private	146	24"	CMP	Replace	300	48"	SLCPP	N/A	None	None
C-24	237+06	Private	750 (buried)	12"	CMP	Replace	153	24"	SLCPP	N/A	None	None
C-24	237+06	Private	113	15"	CMP	Replace	449	30"	SLCPP	N/A	None	None
C-24	237+06	Private	600	24"	CMP	Replace	150	48"	SLCPP	N/A	None	None
Branch 3												
C-25	306+35	Private	270	18"	Clay	Replace	903	30"	SLCPP	N/A	Riprap	Riprap
Main Branch												
C-26	06+47	Primary Public	52	48"	CMP	Replace	56	48"	CMP	4"	Concrete Headwall & Riprap	Concrete Headwall & Riprap
C-27	09+53	Private	19	42"	CMP	Replace	20	48"	CMP	4"	Concrete Bag Headwall & Riprap	Concrete Bag Headwall & Riprap
C-28	10+49	Private	19	48"	CMP	Replace	20	48"	CMP	4"	Concrete Bag Headwall & Riprap	Concrete Bag Headwall & Riprap
C-29	11+10	Private	20	48"	CMP	Install Concrete Bag Headwalls	20	NA		NA	Concrete Bag Headwall & Riprap	Concrete Bag Headwall & Riprap
C-30	17+75	Private	30	48"	CMP		30	NA		NA	None	None
C-31	21+86	Local Public	50	48"	CMP	Regrade Ends	50	NA		NA	Riprap	Riprap
C-32	29+92	Private	25	48"	CMP		25	NA		NA	None	None
C-33	33+63	Private	25	48"	CMP		25	NA		NA	None	None
C-34	37+89	Primary Public	51	48"	CMP		51	NA		NA	None	None
C-35	40+20	Private	100	48"	CMP		100	NA		NA	None	None
C-36	47+86	Local Public	18	36"	CMP		18	NA		NA	None	None
C-37	53+46	Local Public	45	36'	CMP		45	NA		NA	None	None
C-38	57+91	Local Public	45	36"	CMP		45	NA		NA	None	None
C-39	64+92	Primary Public	45	36"	CMP		45	NA		NA	None	None
Totals			3002				5183					

Section 14 - Bridges and Culverts

Bridges and Culverts

Crossing 105+46 (C-1)

		Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	CMP
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)			
Entrance design (projecting, mitered, wingwalls, etc.)		Headwall	Projecting
Total *structure waterway opening* above streambed (sq ft)		12.6 sq/ft	12.6 sq/ft
[X] Elevation of culvert crown	Upstream	607.02	606.90
[ ] bottom of bridge beam (ft)	Downstream	606.55	606.58
Elevation of road grade at *structure* (ft)			607.6
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			35.75 sq/ft

		Existing	Proposed
Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		4 ft	4 ft
Bridge width (parallel to stream) OR culvert length (ft)		10	40
Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		3.75	3.75
Higher elevation of [ ] culvert invert OR [X] streambed within culvert (ft)	Upstream	603.27	603.15
	Downstream	602.8	602.83
Distance from low point of road to mid-point of bridge crossing (ft)	Upstream		
	Downstream		

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 106+35 (C-2)

		Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	RCP
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)			
Entrance design (projecting, mitered, wingwalls, etc.)			Headwall
Total *structure waterway opening* above streambed (sq ft)		12.6 sq/ft	12.6 sq/ft
[X] Elevation of culvert crown	Upstream	608.19	607.85
[ ] bottom of bridge beam (ft)	Downstream	607.80	607.40
Elevation of road grade at *structure* (ft)			614.10
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			35.7 sq/ft

		Existing	Proposed
Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		4 ft	4 ft
Bridge width (parallel to stream) OR culvert length (ft)		60	56
Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		4.0	3.75
Higher elevation of [ ] culvert invert OR [X] streambed within culvert (ft)	Upstream	604.19	604.10
	Downstream	603.80	603.65
Distance from low point of road to mid-point of bridge crossing (ft)	Upstream		
	Downstream		

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 129+22 (C-7)

		Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	CMP
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)			
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting
Total *structure waterway opening* above streambed (sq ft)		7.07	12.60
[X] Elevation of culvert crown	Upstream	619.17	617.23
[ ] bottom of bridge beam (ft)	Downstream	618.90	616.80
Elevation of road grade at *structure* (ft)			621.80
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			57.44

		Existing	Proposed
Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		3	4
Bridge width (parallel to stream) OR culvert length (ft)		166	216
Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		2.62	3.75
Higher elevation of [ ] culvert invert OR [X] streambed within culvert (ft)	Upstream	616.55	613.48
	Downstream	616.28	613.05
Distance from low point of road to mid-point of bridge crossing (ft)	Upstream		
	Downstream		

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Section 14 - Bridges and Culverts (cont.)

RECEIVED File No. ~~09-74-0061-P~~

DEC 0 3 2010

Revised

DNR/WRD
PERMIT CONSOLIDATION UNIT

Bridges and Culverts

Crossing 131+02 (C-8)

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	RCP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		3	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		22	112
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		2.93	3.75
Total *structure waterway opening* above streambed (sq ft)		7.07	12.60				
[X] Elevation of culvert crown	Upstream	619.59	617.48	Higher elevation of [ ] culvert invert OR	Upstream	616.66	613.73
[ ] bottom of bridge beam (ft)	Downstream	619.98	617.23	[X] streambed within culvert (ft)	Downstream	616.95	613.48
Elevation of road grade at *structure* (ft)			621.33	Distance from low point of road to mid-point of bridge crossing (ft)	Upstream Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			45.58				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 136+69 (C-13)

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	RCP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		4	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		27	104
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		4	4
Total *structure waterway opening* above streambed (sq ft)		12.56	12.56				
[X] Elevation of culvert crown	Upstream	622.13	618.80	Higher elevation of [ ] culvert invert OR	Upstream	618.25	615.15
[ ] bottom of bridge beam (ft)	Downstream	621.77	618.59	[X] streambed within culvert (ft)	Downstream	617.89	614.94
Elevation of road grade at *structure* (ft)			622.00	Distance from low point of road to mid-point of bridge crossing (ft)	Upstream Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			33.95				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 164+62 (C-14)

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	CMP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		2.5	2.5
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		20	40
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		2.20	2.25
Total *structure waterway opening* above streambed (sq ft)		4.91	4.91				
[X] Elevation of culvert crown	Upstream	623.85	623.85	Higher elevation of [ ] culvert invert OR	Upstream	621.65	621.60
[ ] bottom of bridge beam (ft)	Downstream	623.82	623.69	[X] streambed within culvert (ft)	Downstream	621.62	621.44
Elevation of road grade at *structure* (ft)			626.00	Distance from low point of road to mid-point of bridge crossing (ft)	Upstream Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			57.44				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Section 14 - Bridges and Culverts (cont.)

Bridges and Culverts

Crossing 167+12 (C-15)

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	CMP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		2.5	2.5
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		20	40
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		2.20	2.25
Total *structure waterway opening* above streambed (sq ft)		4.91	4.91				
[X] Elevation of culvert crown	Upstream	624.50	624.50	Higher elevation of [ ] culvert invert OR	Upstream	622.30	622.25
[ ] bottom of bridge beam (ft)	Downstream	624.25	624.34	[X] streambed within culvert (ft)	Downstream	622.05	622.09
Elevation of road grade at *structure* (ft)			625.10	Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			57.44				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 200+33 (C-16)

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	RCPA	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		3	5 x 3.17
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		30	40
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		2.93	2.67
Total *structure waterway opening* above streambed (sq ft)		7.07	12.44				
[X] Elevation of culvert crown	Upstream	625.33	625.02	Higher elevation of [ ] culvert invert OR	Upstream	622.40	622.35
[ ] bottom of bridge beam (ft)	Downstream	625.33	624.92	[X] streambed within culvert (ft)	Downstream	622.40	622.25
Elevation of road grade at *structure* (ft)			626.20	Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			74.42 sq/ft				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 202+07 (C-17)

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	RCPA	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		3	5 x 3.17
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		115	120
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		2.80	2.67
Total *structure waterway opening* above streambed (sq ft)		7.07	12.44				
[X] Elevation of culvert crown	Upstream	625.75	625.42	Higher elevation of [ ] culvert invert OR	Upstream	622.95	622.75
[ ] bottom of bridge beam (ft)	Downstream	625.47	625.12	[X] streambed within culvert (ft)	Downstream	622.67	622.45
Elevation of road grade at *structure* (ft)			627.35	Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			57.44				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Section 14 - Bridges and Culverts (cont.)

File No. ~~09-74-0061-P~~

RECEIVED

Revised DEC 0 3 2010

DNRE/WRD
PERMIT CONSOLIDATION UNIT

Bridges and Culverts

Crossing 211+61 (C-17A)

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		NA	RCPA	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)			5 x 3.17
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)			320
Entrance design (projecting, mitered, wingwalls, etc.)			Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)			2.67
Total *structure waterway opening* above streambed (sq ft)			12.44				
[X] Elevation of culvert crown	Upstream		626.02	Higher elevation of [ ] culvert invert OR	Upstream	624.23	623.35
[ ] bottom of bridge beam (ft)	Downstream		625.55	[X] streambed within culvert (ft)	Downstream	623.53	622.88
Elevation of road grade at *structure* (ft)				Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			21.41				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 215+66 (C-18) Enclosure

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	SLCPP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		2.5	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		216	365
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		1.84	4
Total *structure waterway opening* above streambed (sq ft)		4.91	12.56				
[X] Elevation of culvert crown	Upstream	627.04	627.46	Higher elevation of [ ] culvert invert OR	Upstream	625.24	623.46
[ ] bottom of bridge beam (ft)	Downstream	627.48	627.10	[X] streambed within culvert (ft)	Downstream	625.19	621.86
Elevation of road grade at *structure* (ft)				Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			57.44				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 218+43 (C-19) Enclosure

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	SLCPP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		2	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		24	75
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		0.72	4
Total *structure waterway opening* above streambed (sq ft)		4.91	12.56				
[X] Elevation of culvert crown	Upstream	626.53	627.54	Higher elevation of [ ] culvert invert OR	Upstream	625.81	623.54
[ ] bottom of bridge beam (ft)	Downstream	626.90	627.46	[X] streambed within culvert (ft)	Downstream	625.81	623.46
Elevation of road grade at *structure* (ft)				Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			57.44				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Section 14 - Bridges and Culverts (cont.)

File No. ~~09-74-0061-P~~

RECEIVED

Revised DEC 0 3 2010

DNRE/WRD
PERMIT CONSOLIDATION UNIT

Bridges and Culverts

Crossing 219+27 (C-20) Enclosure

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	SLCPP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		2	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		82	385
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		1.53	4
Total *structure waterway opening* above streambed (sq ft)		4.91	12.56				
[X] Elevation of culvert crown	Upstream	627.21	627.92	Higher elevation of [ ] culvert invert OR	Upstream	625.68	623.92
[ ] bottom of bridge beam (ft)	Downstream	627.34	627.54	[X] streambed within culvert (ft)	Downstream	625.62	623.54
Elevation of road grade at *structure* (ft)				Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)		N/A					

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 225+91 (C-21) Enclosure

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	SLCPP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		2	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		458	765
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		1.70	4
Total *structure waterway opening* above streambed (sq ft)		4.91	12.56				
[X] Elevation of culvert crown	Upstream	627.38	628.69	Higher elevation of [ ] culvert invert OR	Upstream	625.68	624.69
[ ] bottom of bridge beam (ft)	Downstream	627.59	627.92	[X] streambed within culvert (ft)	Downstream	626.24	623.92
Elevation of road grade at *structure* (ft)				Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)		N/A					

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 231+28 (C-22) Enclosure

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	SLCPP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		2	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		146	300
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		1.35	4
Total *structure waterway opening* above streambed (sq ft)		4.91	12.56				
[X] Elevation of culvert crown	Upstream	628.32	629.00	Higher elevation of [ ] culvert invert OR	Upstream	626.97	625.00
[ ] bottom of bridge beam (ft)	Downstream	628.34	628.69	[X] streambed within culvert (ft)	Downstream	627.02	624.69
Elevation of road grade at *structure* (ft)				Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)		N/A					

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Section 14 - Bridges and Culverts (cont.)

File No. ~~09-74-0061-P~~

Revised

RECEIVED
DEC 0 3 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

Bridges and Culverts

Crossing 237+06 (C-24a) Enclosure

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	SLCPP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		1	2
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		750	152
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		-1.44	2
Total *structure waterway opening* above streambed (sq ft)		0.79	3 14				
[X] Elevation of culvert crown	Upstream	627.34	628.34	Higher elevation of [ ] culvert invert OR	Upstream	628.78	626.34
[ ] bottom of bridge beam (ft)	Downstream	626.67	628.70	[X] streambed within culvert (ft)	Downstream	627.57	626.70
Elevation of road grade at *structure* (ft)				Distance from low point of road to mid-point of bridge crossing (ft)		Upstream Downstream	
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)		N/A					

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 237+06 (C-24b) Enclosure

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	SLCPP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		1.25	2.5
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		113	449
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		0.15	2.5
Total *structure waterway opening* above streambed (sq ft)		1.23	4.91				
[X] Elevation of culvert crown	Upstream	627.95	628.34	Higher elevation of [ ] culvert invert OR	Upstream	627.80	626.04
[ ] bottom of bridge beam (ft)	Downstream	628.54	627.64	[X] streambed within culvert (ft)	Downstream	627.63	625.14
Elevation of road grade at *structure* (ft)				Distance from low point of road to mid-point of bridge crossing (ft)		Upstream Downstream	
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)		N/A					

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 237+06 (C-24c) Enclosure

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	SLCPP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		2	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		600	150
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		1.04	4
Total *structure waterway opening* above streambed (sq ft)		3.14	12.56				
[X] Elevation of culvert crown	Upstream	628.67	629.14	Higher elevation of [ ] culvert invert OR	Upstream	627.63	625.14
[ ] bottom of bridge beam (ft)	Downstream	628.67	629.00	[X] streambed within culvert (ft)	Downstream	627.57	625.00
Elevation of road grade at *structure* (ft)				Distance from low point of road to mid-point of bridge crossing (ft)		Upstream Downstream	
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)		N/A					

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [X] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Section 14 - Bridges and Culverts (cont.)

File No. 09-74-0061-P

Bridges and Culverts

Crossing 06+47 (C-26)

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	CMP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		4	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		52	56
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Headwall	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		3.67	3.66
Total *structure waterway opening* above streambed (sq ft)		12.56	12.56				
[X] Elevation of culvert crown	Upstream	609.64	609.56	Higher elevation of [ ] culvert invert OR	Upstream	605.97	605.90
[ ] bottom of bridge beam (ft)	Downstream	608.99	609.00	[X] streambed within culvert (ft)	Downstream	605.27	605.34
Elevation of road grade at *structure* (ft)			615.16	Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			113.75				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [ ] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 09+53 (C-27)

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	CMP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		3.5	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		19	20
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		3.35	3.67
Total *structure waterway opening* above streambed (sq ft)		9.62	12.56				
[X] Elevation of culvert crown	Upstream	610.26	610.60	Higher elevation of [ ] culvert invert OR	Upstream	606.91	606.93
[ ] bottom of bridge beam (ft)	Downstream	610.15	610.40	[X] streambed within culvert (ft)	Downstream	606.83	606.73
Elevation of road grade at *structure* (ft)			612.24	Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			113.75 sq/ft				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [ ] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Bridges and Culverts

Crossing 10+49 (C-28)

		Existing	Proposed			Existing	Proposed
Culvert Type (box, circular, arch) and material (corrugated metal, timber, concrete, etc.)		CMP	CMP	Bridge span (length perpendicular to stream) OR culvert [ ] width [X] diameter (ft)		4	4
Bridge Type (concrete box beam, timber, concrete I-beam, etc.)				Bridge width (parallel to stream) OR culvert length (ft)		19	20
Entrance design (projecting, mitered, wingwalls, etc.)		Projecting	Projecting	Bridge rise (from bottom of beam to streambed) OR Culvert Rise (from top of culvert to streambed) (ft)		3.74	3.67
Total *structure waterway opening* above streambed (sq ft)		12.56	12.56				
[X] Elevation of culvert crown	Upstream	611.26	611.20	Higher elevation of [ ] culvert invert OR	Upstream	607.52	607.53
[ ] bottom of bridge beam (ft)	Downstream	611.16	611.00	[X] streambed within culvert (ft)	Downstream	607.31	607.33
Elevation of road grade at *structure* (ft)			612.79	Distance from low point of road to mid-point of bridge crossing (ft)	Upstream / Downstream		
Cross-sectional area for primary channel (sq ft) (See Sample Drawing 14C)			113.75 sq/ft				

Reference datum used (show on plans with description) [ ] NGVD 29 [ ] IGLD (Great Lakes Coastal Area) [ ] local NAVD 88

High water elevation-describe reference point and highest known water level above or below reference point and date of observation

Revised

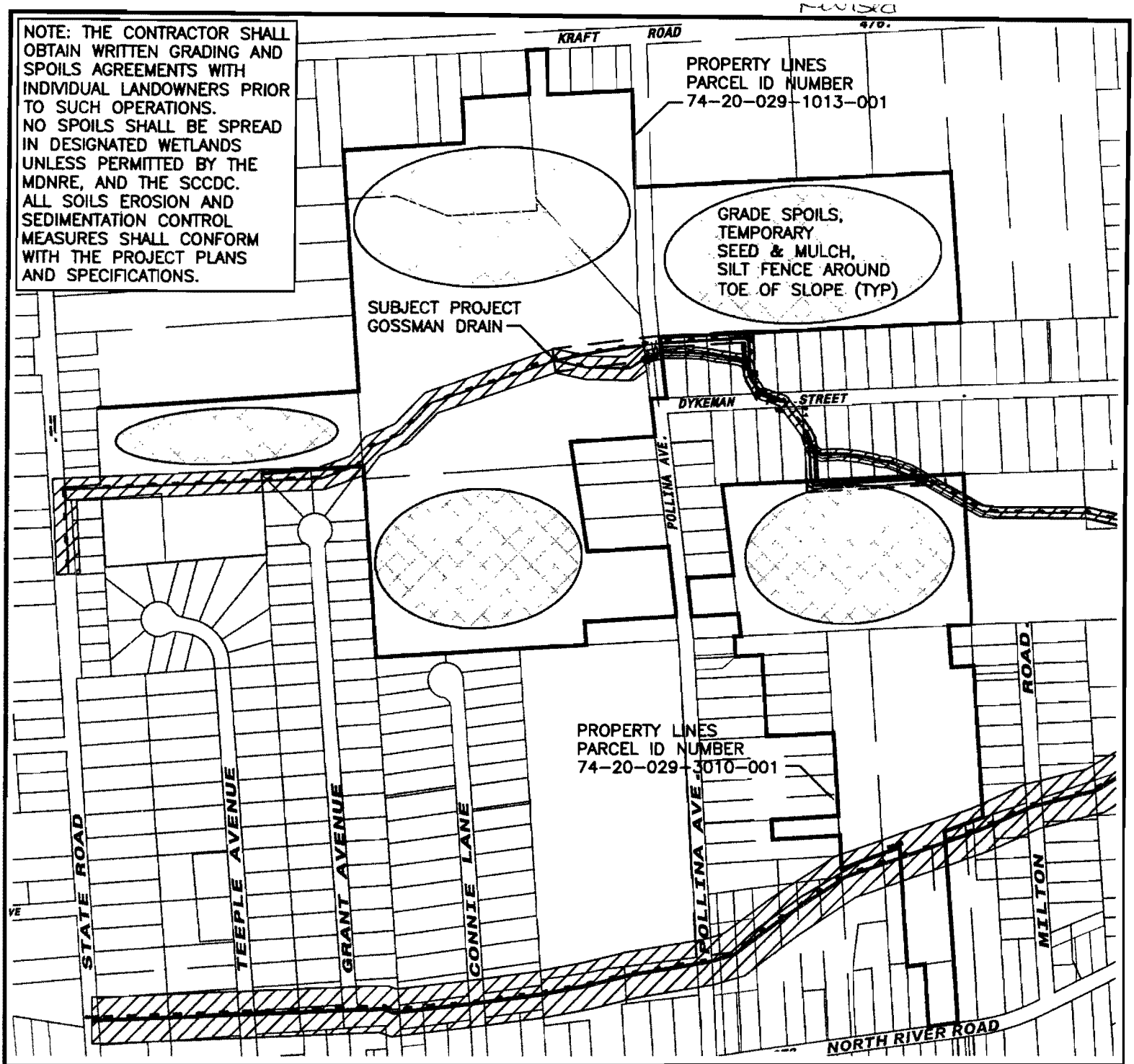
Eric Ostling

From: Wiley, Robert [rwiley@stclaircounty.org]
Sent: Wednesday, December 01, 2010 9:19 AM
To: Eric Ostling
Subject: Fw: Spoiled Dirt Grossman Drain

Sent via BlackBerry by AT&T

From: Bernard Teltow <teltowcontracting@yahoo.com>
Date: Wed, 1 Dec 2010 09:17:29 -0500
To: Wiley, Robert<rwiley@stclaircounty.org>
Subject: Spoiled Dirt Grossman Drain

Pro-Tel Development hereby gives St. Clair County Drain Commission the rights to dispose of - Clean, Stump Free, Root Free, Debris Free, Fill Dirt on Pro-Tel Property. Dirt Shall be Dumped per Owner Location. Dirt Shall Be Leveled, Seeded + Mulched per Owner's Satisfaction. A Minimum of 3 Weeks notice shall be given before dumping. Any damage to property while dumping shall be repaired with no cost to Owner.
Bernard C. Teltow



SKETCH OF PROJECT SPOILS DISPOSAL AREAS

MDNRE/USACE JOINT PERMIT APPLICATION

PERMIT FILE NO.: 10-74-0104-P GOSSMAN DRAIN PROJECT

CLIENT: ST. CLAIR COUNTY DRAIN COMMISSIONER BOB WILEY

LANDOWNER: PRO-TEL DEVELOPMENT, 74-20-029-1013-001 & -3010-001

PART OF THE NORTH 1/2 OF SECTION 29
T 7 N, R 17 E, FORT GRATIOT TOWNSHIP
ST. CLAIR COUNTY, MICHIGAN

0 200 400

Scale: 1"=400'H

Scale: 1"=5'V

RECEIVED
DEC 0 3 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

HURON CONSULTANTS

Date: 11/19/2010	Checked By: SKS, PE	Job No.: 04-1228
Drawn By: EJO, PE	Approved By: EJO, PE	Sheet 1 of 1

32

DESIGN DRAWINGS FOR

Revised

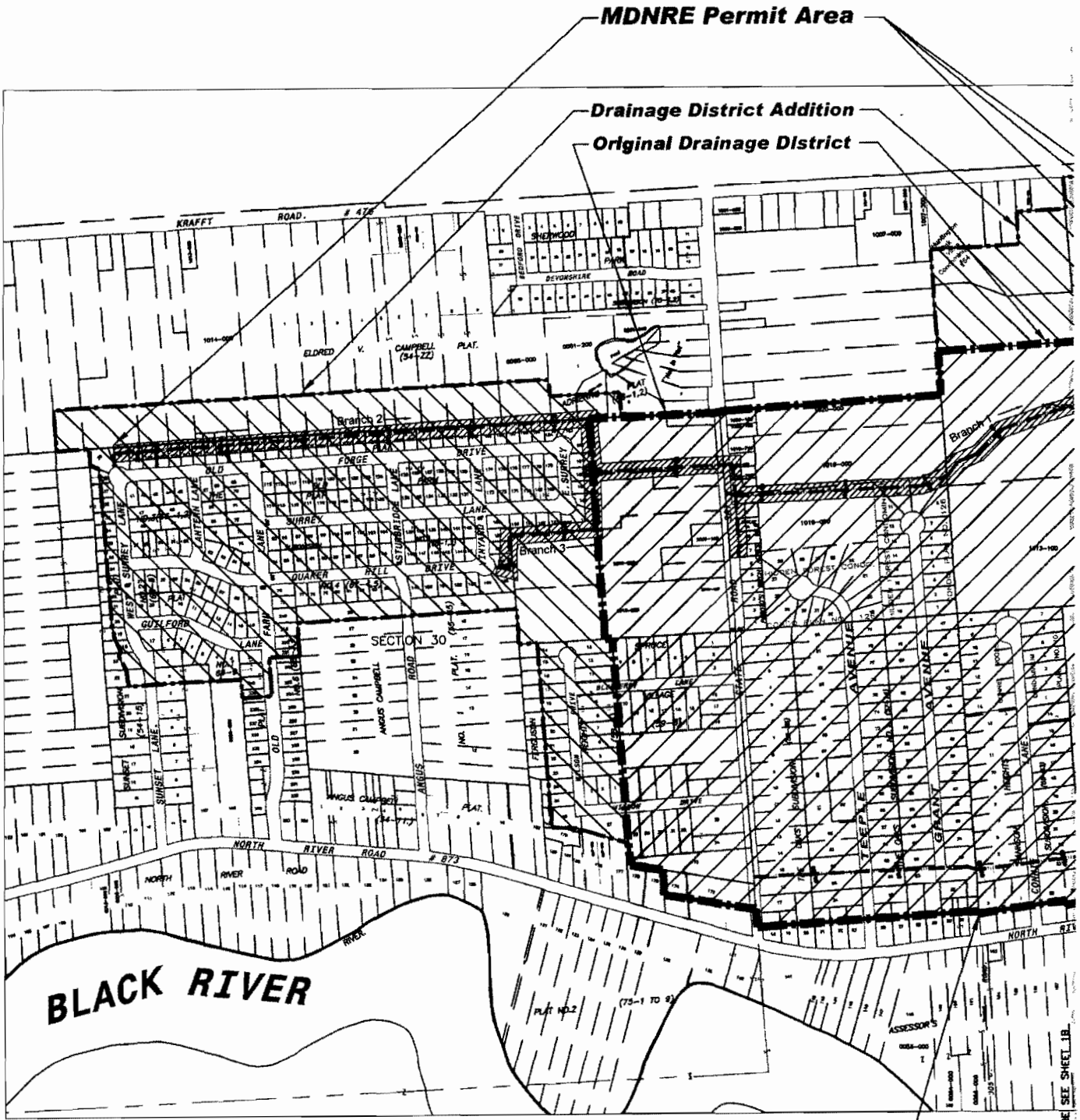
GOSSMAN DRAIN PROJECT

BOB WILEY, ST. CLAIR COUNTY DRAIN COMMISSIONER

T.7N. - R.17.E. - Sections 28, 29, 30

FORT GRATIOT TOWNSHIP

ST. CLAIR COUNTY, MICHIGAN



MATCH LINE SEE SHEET 1B

MATCH LINE SEE SHEET 1B

SHEET 1A
COVER SHEET

Revised

MATCH LINE SEE SHEET 1A

NOTES:
THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR TOWARD THE SCOPE OF WORK UNLESS SPECIFIED OTHERWISE.

THE CONTRACTOR SHALL INDEPENDENTLY VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO EXCAVATION AND CONSTRUCTION.

THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY DISCOVERED CONFLICTS TO SCCDC AND HURON CONSULTANTS.

ST. CLAIR COUNTY ROAD COMMISSION NOTES:

"All applicable construction shall comply with St. Clair County RoadCommission standards and specifications. Approval of the plans by the St. Clair County Road Commission does not relieve the owner/developer of this requirement nor does it give approval to any errors and/or omissions contained in the plans."

It is the Contractor's responsibility to notify the Road Commission, 1 day in advance, of any necessary sign removal within the project limits. If the Contractor fails to notify the Road Commission, then the Contractor assumes liability of any and all signs damaged within the project limits and will be charged for the replacement of said signs.

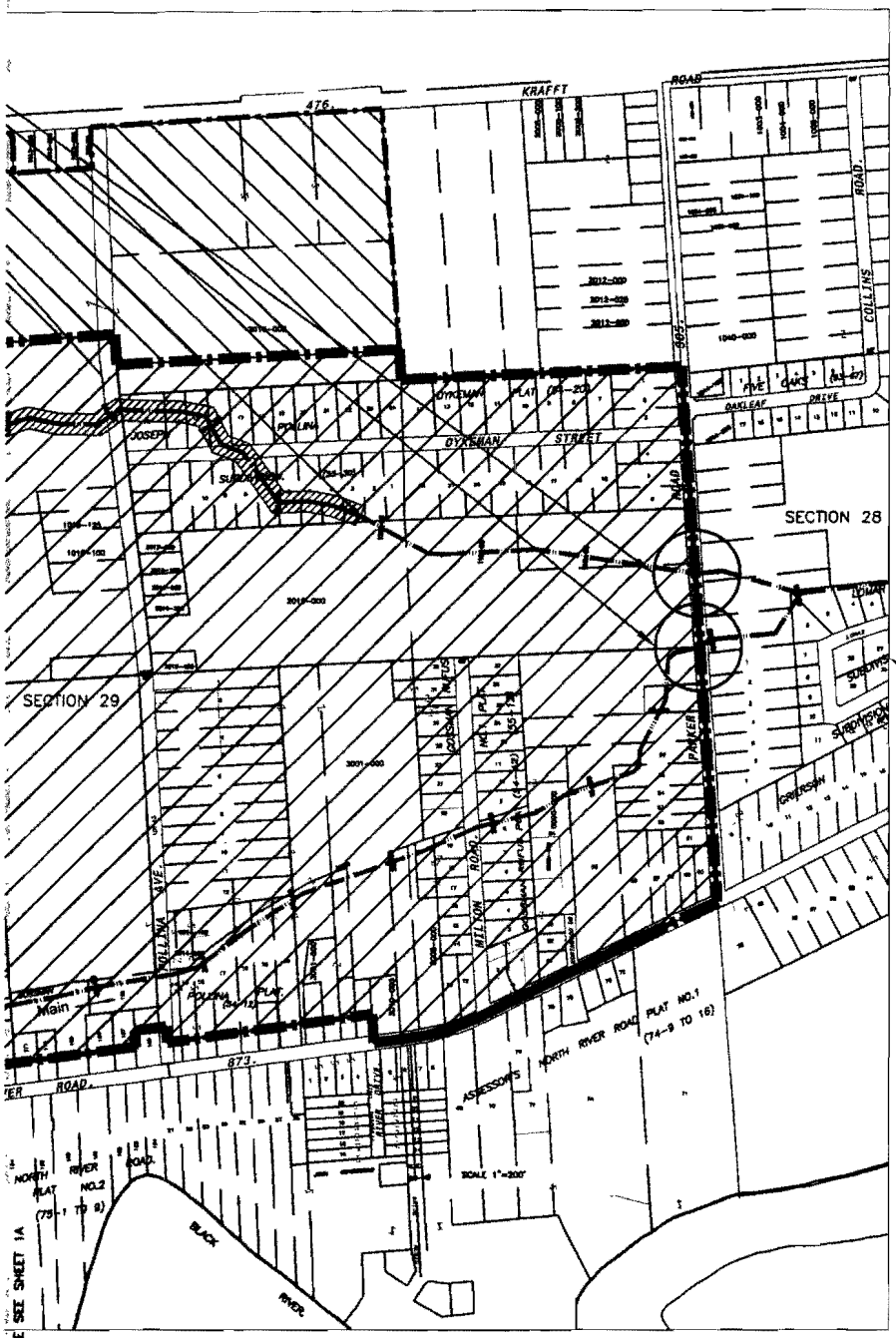
The placing of permanent traffic control signs shall be done in accordance with the "Michigan Manual of Uniform Traffic Control Devices, 2005 Edition" as Amended. This work will be done by the St. Clair County Road Commission prior to the final acceptance of the project.

MDOT Turf Establishment 816 2003 Standard Specifications for Construction

0 400 800
1" = 400'

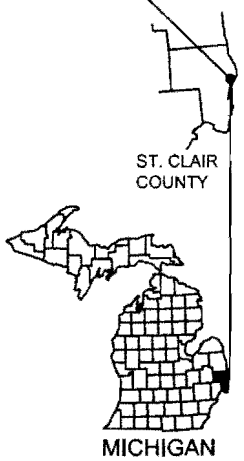
N

Sheet Index	
1	Cover Sheet
2	Notes and Utility Information
3	Main Branch, Sta 00+00 to 16+00
4	Main Branch, Sta 16+00 to 32+00
5	Main Branch, Sta 32+00 to 49+00
6	Main Branch, Sta 49+00 to 65+00
7	Branch 1, Sta 100+00 to 116+00
8	Branch 1, Sta 116+00 to 132+00
9	Branch 1, Sta 132+00 to 148+00
10	Branch 1, Sta 148+00 to 163+85
11	Branch 1, Sta 163+85 to 168+00
12	Branch 2, Sta 200+00 to 214+60
13	Branch 2, Sta 214+60 to 228+25
14	Branch 2, Sta 228+25 to 242+10
15	Branch 3, Sta 300+00 to 311+93
16	Crossing Details
17	General Details



EXISTING DRAINAGE DISTRICT = 424.17 ACRES
PROPOSED DRAINAGE DISTRICT = 596.59 AC.
INCLUDES:
57.02 ACRES OF COUNTY ROAD R.O.W.

DRAIN LENGTHS:
Main Branch - 1.20 miles
Branch 1 - 1.20 miles
Branch 2 - 0.80 miles
Branch 3 - 0.22 miles
TOTAL LENGTH - 3.42 miles



MISS DIG
Michigan's One-Call Utility
Notification Organization
Three full working days before you dig, call the MISS DIG System at
1-(800)-482-7171

MATCH LINE SEE SHEET 1A

901 Huron Ave, Suite B
Port Huron, MI 48060
PHONE: 810-966-0680
FAX: 810-966-0681
HURON CONSULTANTS
www.huronconsultants.com

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT: Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR:
Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

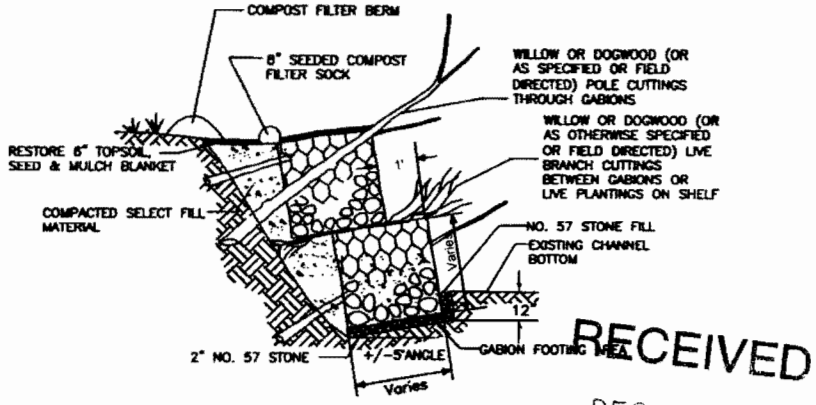
STATUS:
☐ PRELIMINARY
☐ FINAL
■ CONSTRUCTION

REVISION DATE:
1
2
3

PROJECT NO.: 04-1228
DATE: SEPTEMBER 10, 2010

SHEET 1B
COVER

Revised

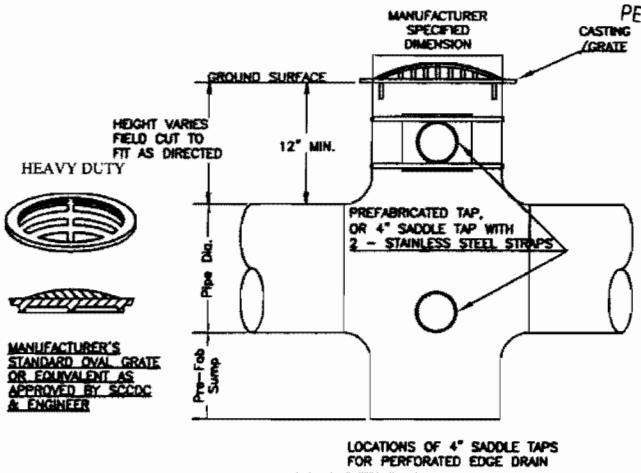


1/2 VEGETATED ROCK GABION
NOT TO SCALE

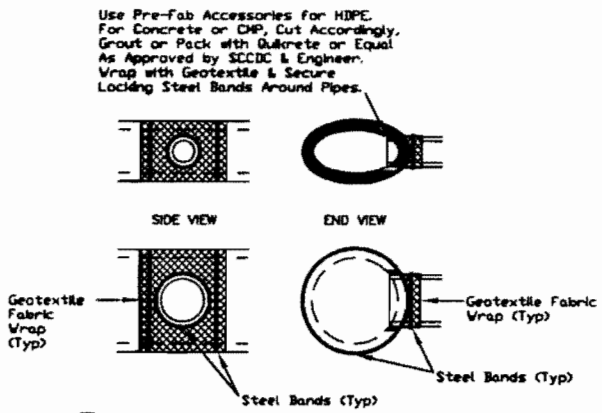
Installation Sequence

1. Excavate the gabion footing area as shown on the detail. Slope the excavation at 6H:1V.
2. Place a 2" layer of No. 57 stone over the footing area.
3. Assemble and place the first course of wire gabion baskets in the footing area with the lid open toward the channel (i.e., lid should rotate up and away from the channel).
4. Partially fill the basket with riprap, keeping the rock toward the front of the basket and dipping down toward the back bottom corner of the basket.
5. Place select fill over the rock until all voids in the rock are filled, while maintaining the slope toward the back.
6. Place additional select fill in a thin layer over the rocks.
7. Insert pole cuttings through the basket mesh (basal end first) and on top of the soil layer dipping down and through the back of the basket and into the 'native' soil.
8. Place additional select fill as necessary to cover the pole.
9. Fill the basket with riprap, using reasonable care not to damage the pole cuttings.
10. Close and fasten the basket lid.
11. Fill any voids between the back of the basket and the 'native' soils with select fill to the top of the basket.
12. Place select fill over the rock, again, until all voids in the rock are filled and a thin layer covers the basket.
13. Place live branch cuttings on the soil layer at right angles to the wall with the growing tips to the front and the basal ends in the select fill behind the basket.
14. Place another thin layer of select fill over the live branch cuttings.
15. Compact and/or firmly tamp the select fill to ensure good contact with the cuttings.
16. Repeat the procedures for each successive course until the required height is reached.
17. Fill and voids in the footing area between the front of the basket and the existing channel bottom with No. 57 stone.
18. Install the seeded compost filter sock, seeded compost blanket, and compost filter berm as shown on the detail on this sheet and the Erosion Control Detail sheet.

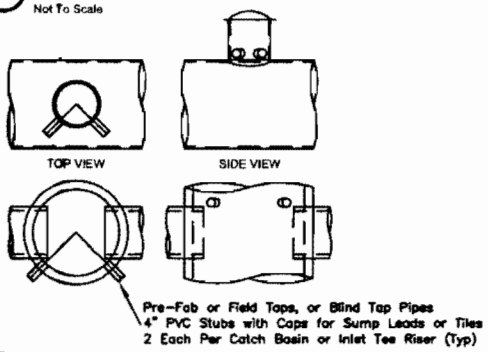
RECEIVED
DEC 0 3 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT



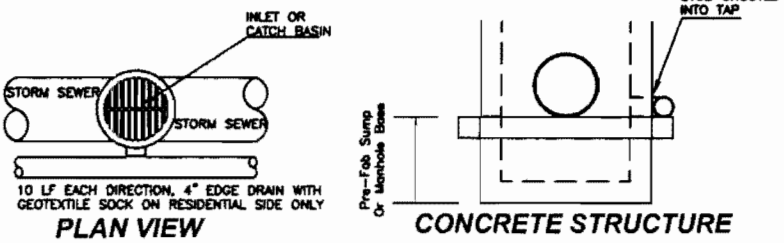
PLASTIC STRUCTURE



3/2 Blind Tap Detail
Not To Scale

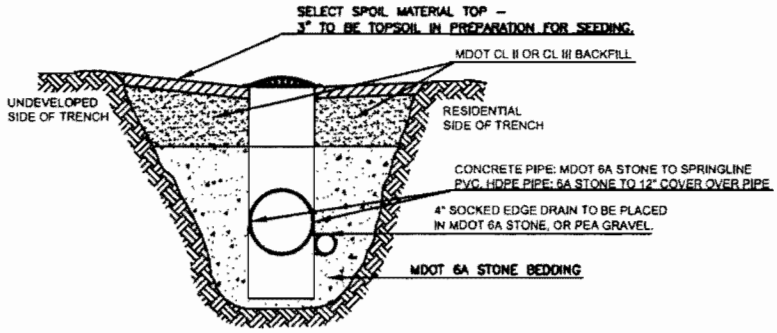


4/2 Catch Basin Sump Tap Detail
Not To Scale



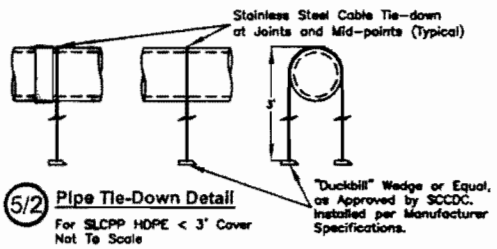
PLAN VIEW

CONCRETE STRUCTURE



PROFILE VIEW

2/2 EDGE DRAIN PLACEMENT DETAIL
NOT TO SCALE



5/2 Pipe Tie-Down Detail
For SLCPP HDPE < 3' Cover
Not To Scale

NOTES:

1. THE LOCATION OF THE EDGE DRAIN SADDLE TAPS ARE TO BE ON THE VERTICAL BARREL OF THE CATCH BASIN IF THERE IS INSUFFICIENT HEIGHT CLEARANCE, THEN THE SADDLE TAPS CAN BE BLIND TAPS ON THE CULVERT PIPE WITH THE ENGINEERS APPROVAL.
2. THE SOCKED, PERFORATED EDGE DRAIN (4" DIA.) SHALL BE CONNECTED TO THE PROVIDED TAPS. MANUFACTURER RECOMMENDED STRAPS / CONNECTORS SHOULD BE USED. DUCT TAPE IS NOT APPROVED FOR THIS CONNECTION.
3. CONNECT 20 LFT. LENGTH OF 4" DIA. SOCKED EDGE DRAIN TO EACH STUB TAP OUT OF THE CATCH BASIN. EDGE DRAIN SHALL BE PLACED PARALLEL TO THE STORM SEWER OR PROPERTY LINE.
4. DRAIN TILE TYPE PVC OR HDPE OR EQUAL AS APPROVED BY THE SCCDC & ENGINEER.
5. THE CONTRACTOR SHALL PROVIDE SILT-SACKS OR EQUAL AS APPROVED BY THE SCCDC & ENGINEER AT ALL EXISTING AND PROPOSED INLETS AND CATCH BASINS WITHIN THE INFLUENCE OF CONSTRUCTION OPERATIONS, AND AS DIRECTED IN THE FIELD. ALL SOIL EROSION CONTROL MEASURES SHALL BE DAILY INSPECTED FOR MAINTENANCE, AND IMMEDIATELY SERVICED OR REPLACED AS NECESSARY, AND AS FIELD DIRECTED.

MATCH LINE SEE SHEET 2B

MATCH LINE SEE SHEET 2B

SHEET 2A
NOTES AND
UTILITY INFORMATION

Revised

MATCH LINE SEE SHEET 2A

CULVERT REPLACEMENT SPREADSHEET

			Existing				Proposed					
Crossing No.	C/L Location	Use	Length (ft)	Size	Type	Project Status	Length (ft)	Size	Type	New Culvert Recess	New Inlet End Treatment	New Outlet End Treatment
Branch 1												
C-1	105+46	Private	10	48"	CMP	Replace	40	48"	CMP	N/A	Riprap	Riprap
C-2	106+35	Primary Public	60	48"	CMP	Replace	56	48"	CMP	N/A	Concrete Headwall & Riprap	Concrete Headwall & Riprap
C-3	124+61	Private	17	36"	CMP	Remove	0		-	-	-	-
C-4	125+57	Private	15	36"	CMP	Remove	0		-	-	-	-
C-5	126+36	Private	18	36"	CMP	Remove	0		-	-	-	-
C-6	126+96	Private	20	36"	CMP	Remove	0		-	-	-	-
C-7	129+22	Local Public	166	48"	CMP	Replace	216	48"	RCP	4"	Riprap	Riprap
C-8	131+02	Private	22	36"	CMP	Replace	112	48"	RCP	4"	Riprap	Riprap
C-9	132+80	Private			Bridge	Remove	0		-	-	-	-
C-10	133+83	Private	9	42"	CMP	Remove	0		-	-	-	-
C-11	134+41	Private			Bridge	Remove	0		-	-	-	-
C-12	135+44	Private			Bridge	Remove	0		-	-	-	-
C-13	136+89	Local Public	27	48"	CMP	Replace	104	48"	RCP	4"	Riprap	Riprap
C-14	164+62	Private	20	30"	CMP	Replace	40	30"	CMP	N/A	Grade Banks	Grade Banks
C-15	167+12	Private	20	30"	CMP	Replace	40	30"	CMP	N/A	Grade Banks	Grade Banks
Branch 2												
C-16	200+33	Private	30	36"	CMP	Replace	40	60"x38"	RCPA	6"	Riprap	Riprap
C-17	202+07	Primary Public	115	36"	CMP	Replace	120	60"x38"	RCPA	6"	Riprap	Riprap
C-17-A	211+61	Private	0				320	60"x38"	RCPA	6"	Riprap	Riprap
C-18	215+66	Private	216	30"	CMP	Replace	365	48"	SLCPP	N/A	None	Riprap
C-19	218+43	Private	24	24"	CMP	Replace	75	48"	SLCPP	N/A	None	None
C-20	219+27	Private	82	24"	CMP	Replace	385	48"	SLCPP	N/A	None	None
C-21	225+91	Private	458	24"	CMP	Replace	765	48"	SLCPP	N/A	None	None
C-22	231+28	Private	146	24"	CMP	Replace	300	48"	SLCPP	N/A	None	None
C-24	237+06	Private	750 (buried)	12"	CMP	Replace	153	24"	SLCPP	N/A	None	None
C-24	237+06	Private	113	15"	CMP	Replace	449	30"	SLCPP	N/A	None	None
C-24	237+06	Private	600	24"	CMP	Replace	150	48"	SLCPP	N/A	None	None
Branch 3												
C-25	306+35	Private	270	18"	Clay	Replace	903	30"	SLCPP	N/A	Riprap	Riprap
Main Branch												
C-26	06+47	Primary Public	52	48"	CMP	Replace	56	48"	CMP	4"	Concrete Headwall & Riprap	Concrete Headwall & Riprap
C-27	09+53	Private	19	42"	CMP	Replace	20	48"	CMP	4"	Concrete Bag Headwall & Riprap	Concrete Bag Headwall & Riprap
C-28	10+49	Private	19	48"	CMP	Replace	20	48"	CMP	4"	Concrete Bag Headwall & Riprap	Concrete Bag Headwall & Riprap
C-29	11+10	Private	20	48"	CMP	Install Concrete Bag Headwalls	20	NA		NA	Concrete Bag Headwall & Riprap	Concrete Bag Headwall & Riprap
C-30	17+75	Private	30	48"	CMP		30	NA		NA	None	None
C-31	21+86	Local Public	50	48"	CMP	Regrade Ends	50	NA		NA	Riprap	Riprap
C-32	29+92	Private	25	48"	CMP		25	NA		NA	None	None
C-33	33+63	Private	25	48"	CMP		25	NA		NA	None	None
C-34	37+89	Primary Public	51	48"	CMP		51	NA		NA	None	None
C-35	40+20	Private	100	48"	CMP		100	NA		NA	None	None
C-36	47+86	Local Public	18	36"	CMP		18	NA		NA	None	None
C-37	53+46	Local Public	45	36"	CMP		45	NA		NA	None	None
C-38	57+91	Local Public	45	36"	CMP		45	NA		NA	None	None
C-39	64+92	Primary Public	45	36"	CMP		45	NA		NA	None	None
Totals			3002				5183					

NOTES:

- All work shall conform with the Rules of the St. Clair County Drain Commissioner, MDOT 2003 Standard Specifications for Construction, and all other applicable standards, unless otherwise specified.
- SCCDC is the soil erosion inspector for the project.
- Clearing and Grubbing, and Snagging are to be included in the pay items, and will not be paid for separately, unless specified.
- All disposal of cleared vegetation, excavation spoils, and debris is the responsibility of the contractor to an offsite location unless otherwise directed by the Engineer and SCCDC.
- Indication of possible spoils piles on plans near major excavations does not indicate agreements are in place with landowners.
- Contractor shall obtain written grading and spoil disposal agreements with individual landowners prior to such operations.
- No spoils shall be spread in designated wetlands unless directed by the Engineer, SCCDC and the MDNRE.
- Survey information has been obtained from field observation and record documents. Completeness and accuracy are neither guaranteed nor implied. Subsurface features cannot be precisely illustrated on the plans. It is solely the Contractor's responsibility to field verify location and depth of all utilities, whether or not shown on the plans, prior to excavation and construction.
- Discrepancies and conflicts will immediately be reported to the SCCDC and Engineer for direction.

SOIL EROSION & SEDIMENTATION CONTROL KEY

3	SEEDING WITH MULCH AND/OR MATTING	FACILITATES ESTABLISHMENT OF VEGETATIVE COVER EFFECTIVE FOR DRAINAGEWAYS WITH LOW VELOCITY EASILY PLACED IN SMALL QUANTITIES BY INEXPERIENCED PERSONNEL SHOULD INCLUDE PREPARED TOPSOIL BED
7	RIPRAP, RUBBLE, GABIONS	USED WHERE VEGETATION IS NOT EASILY ESTABLISHED EFFECTIVE FOR HIGH VELOCITIES OR HIGH CONCENTRATIONS PERMITS RUNOFF TO INFILTRATE SOIL DISSIPATES ENERGY FLOW AT SYSTEM OUTLETS
34	COFFERDAM	WORK CAN BE CONTINUED DURING MOST ANTICIPATED STREAM CONDITIONS CLEAR WATER CAN BE PUMPED DIRECTLY BACK INTO STREAM
37	CHECK DAMS	REDUCES FLOW VELOCITY CATCHES SEDIMENT CAN BE CONSTRUCTED OF LOGS OR SAND BAGS
26	SILT FENCE	USES GEOTEXTILE FABRIC AND POSTS OR POLES. EASY TO CONSTRUCT AND LOCATE AS NECESSARY.

ABBREVIATIONS:

Approx. – Approximately
BM – Benchmark
CL – Centerline
CMP – Corrugated Metal Pipe
CMPA – Corrugated Metal Pipe Arched
Con. – Concrete
Cul. – Culvert
DND – Do Not Disturb
Elev. – Elevation
Ex. – Existing
HDPE – High Density Polyethylene
LFT – Left
Max. – Maximum
Min. – Minimum
No. – Number
Pr. – Proposed
PVC – Polyvinyl Chloride Pipe
RCP – Reinforced Concrete Pipe
RCPA – Reinforced Concrete Pipe Arched
R.O.W. – Right of Way
RR – Railroad
RT – Right
SCCDC – St. Clair County Drain Commission
SLCPP – Smooth Lined Corrugated Plastic Pipe
Sta – Station
Typ. – Typical

UTILITY CONTACTS:

Glen Sowinski
AT & T
2020 Bancroft Street
Port Huron, Michigan 48060
(810) 984-9649x101

James Stitzel
Comcast
6095 Wall Street
Sterling Heights, Michigan 48312
(586) 883-7253

Douglas Hannon
Township Supervisor
Fort Gratiot Township
3720 Keewahdin Rd
Fort Gratiot, MI 48059
(810) 385-4489

Jorja Baldwin
Zoning Administrator
Fort Gratiot Township
3720 Keewahdin Rd
Fort Gratiot, MI 48059
(810) 385-4489 ext. 104

RECEIVED
DEC 03 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

Department of Public Works
Fort Gratiot Township
3720 Keewahdin Rd.
Fort Gratiot, Michigan 48059
(810) 385-4489 ext. 101

Robin O' Connell
IGS Group (OTE)
2000 Second Ave. Rm. 518 S.B.
Detroit, Michigan 48226
(313) 235-5632

Kristin Goetze
Johnson & Anderson, Inc.
3910 Lapeer Road
Port Huron, MI 48060
(810) 987-7820

Randy Culp
SEMCO Energy
1411 Third Street, Suite A
Port Huron, Michigan 48060
(810) 987-7900 Ext. 5058

LEGEND:

- Existing Drain Bottom
- Top of Bank
- Easement Boundary
- Replace Crossing
- Do Not Disturb (DND)
- Utility Manhole
- Gas Marking
- Existing Building
- Water Service
- Telephone
- Power Pole
- Tree
- Side Drain Pipe
- Side Drain
- Benchmark
- Sanitary Manhole
- Stormwater Manhole
- Utility Manhole
- Iron
- Stormwater Catch basin
- J-Hook
- Cross Vane
- SESC Number
- Mail Box
- Well
- Section Corner
- DND Do Not Disturb
- Gate Valve
- High Tension Tower
- Detail No. / Page No.

901 Huron Ave, Suite B
Port Huron, MI 48060
PHONE: 810-966-0680
FAX: 810-966-0681
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT: Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR: Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS: ☐ PRELIMINARY ☐ FINAL ■ CONSTRUCTION

REVISION DATE: 1 2 3

DATE: SEPTEMBER 10, 2010

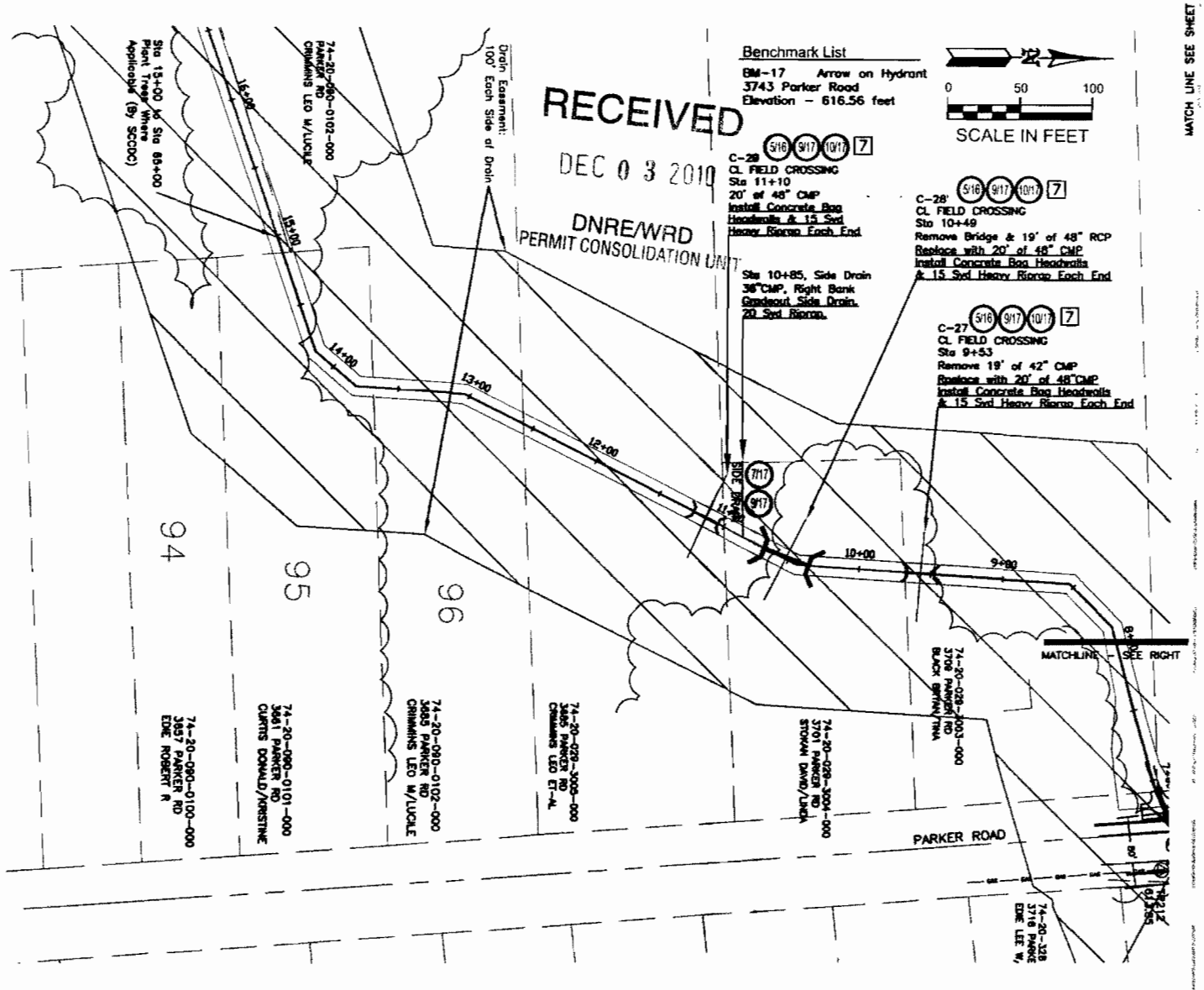
PROJECT NO.: 04-1228

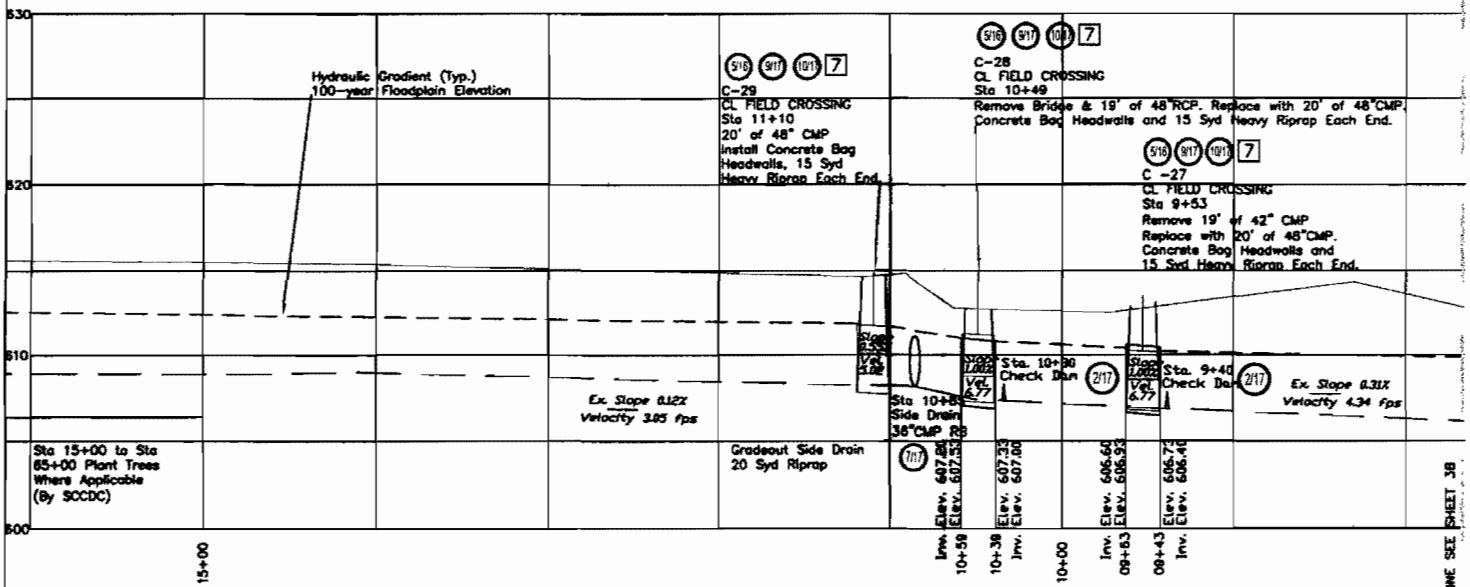
SHEET 2B
NOTES AND UTILITY INFORMATION

36

MATCH LINE SEE SHEET 2A

Revised

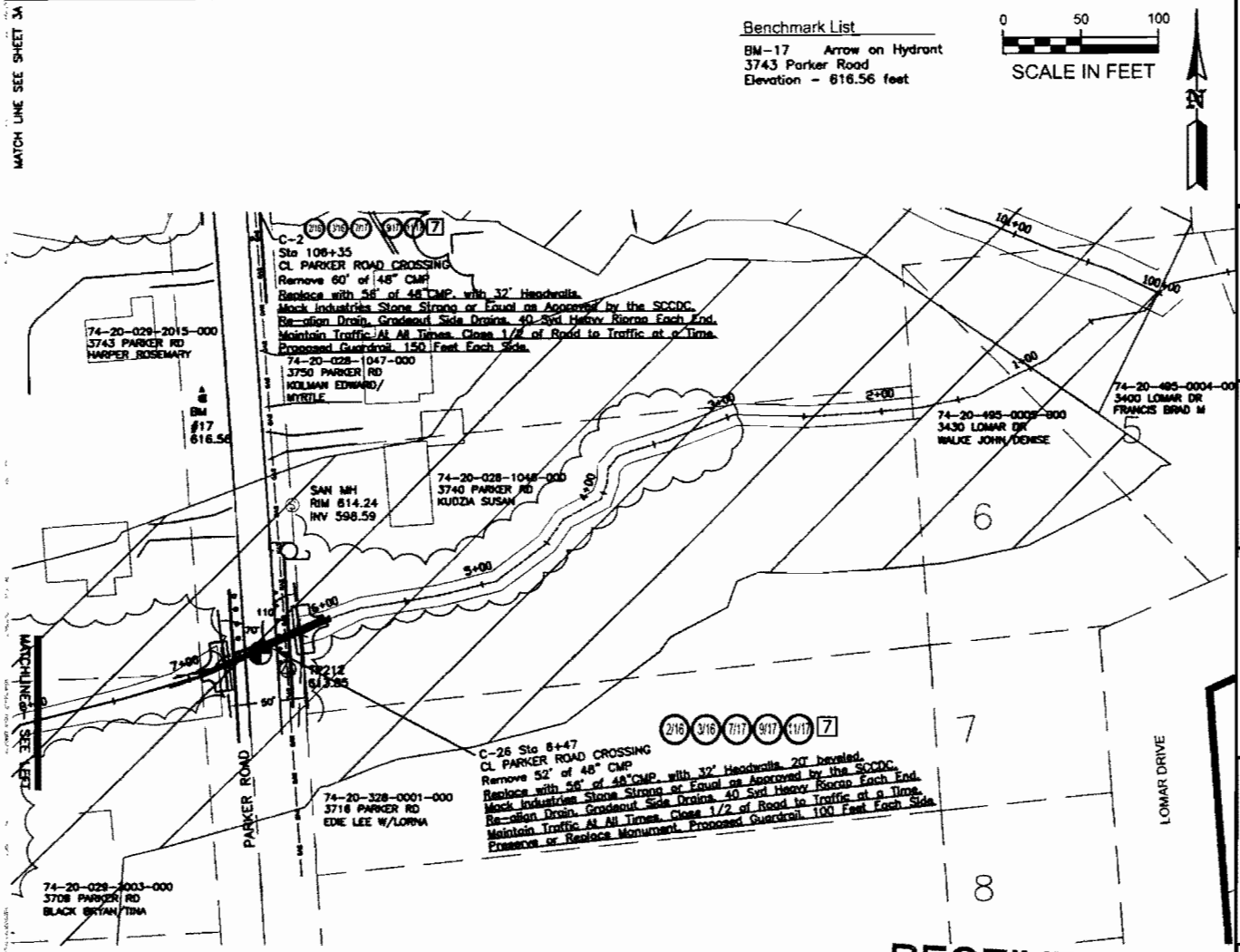


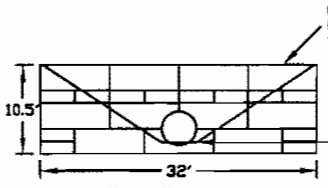


SHEET 3A
PLAN & PROFILE
Branch 1

37

Revised



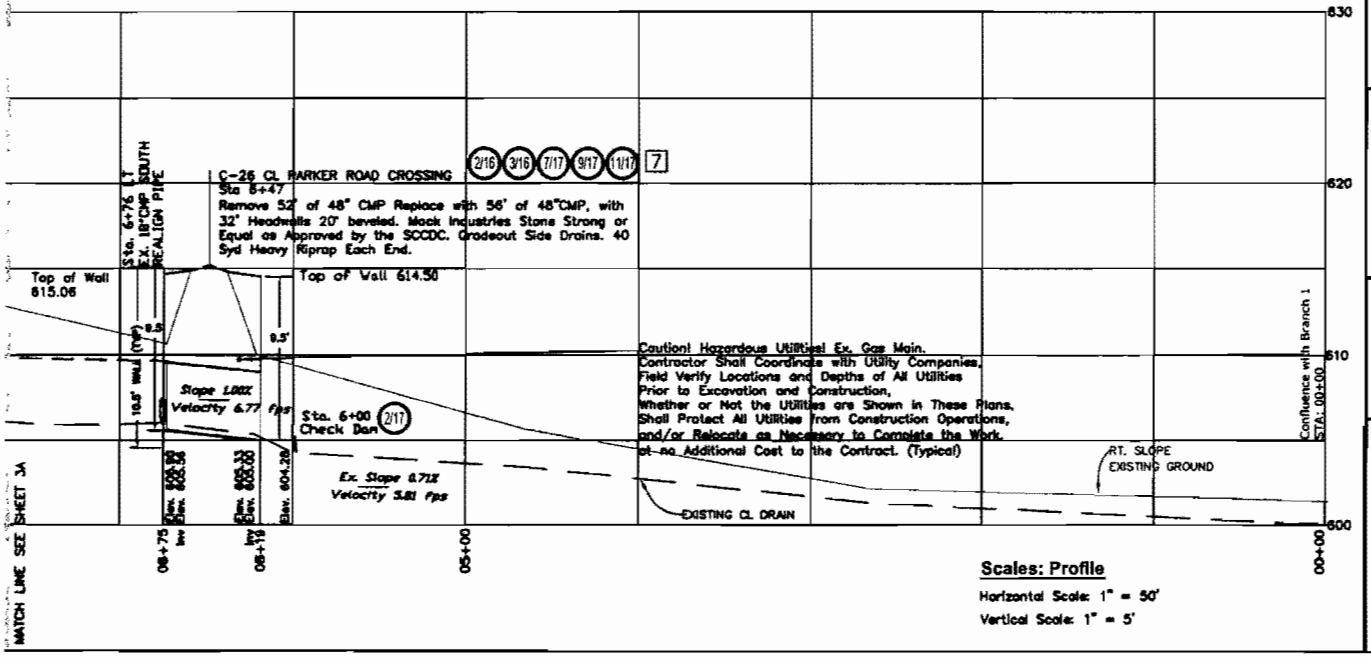


Headwall Detail

Sta 06+19 & 06+75
Not To Scale

4' Wide Bottom, 1.5:1 Side Slopes
48"CMP, Invert 4" Below Channel.
Gradeout Side Drains. 40 Syd Heavy Riprap Each End.
Restore 3" Topsoil, Seed & Mulch Blanket All Surfaces.
(Typ) 4/17 3

RECEIVED
DEC 0 3 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT



Scales: Profile

Horizontal Scale: 1" = 50'
Vertical Scale: 1" = 5'

901 Huron Ave, Suite B
Port Huron, MI 48060
PHONE: 810-966-0660
FAX: 810-966-0681
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT:
Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR:
Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS:
☐ PRELIMINARY
☐ FINAL
■ CONSTRUCTION

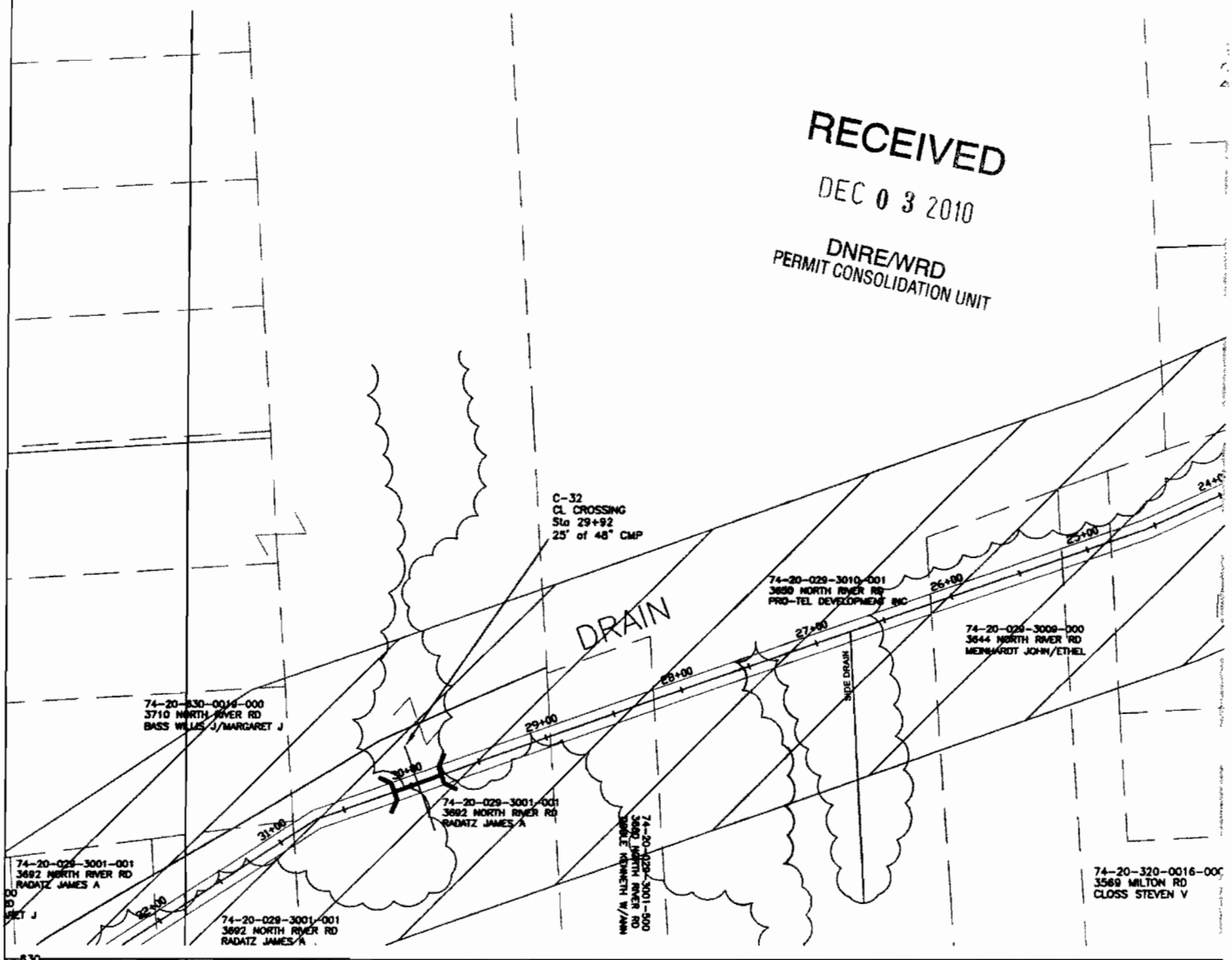
REVISION DATE:
1 November 9, 2010
2
3

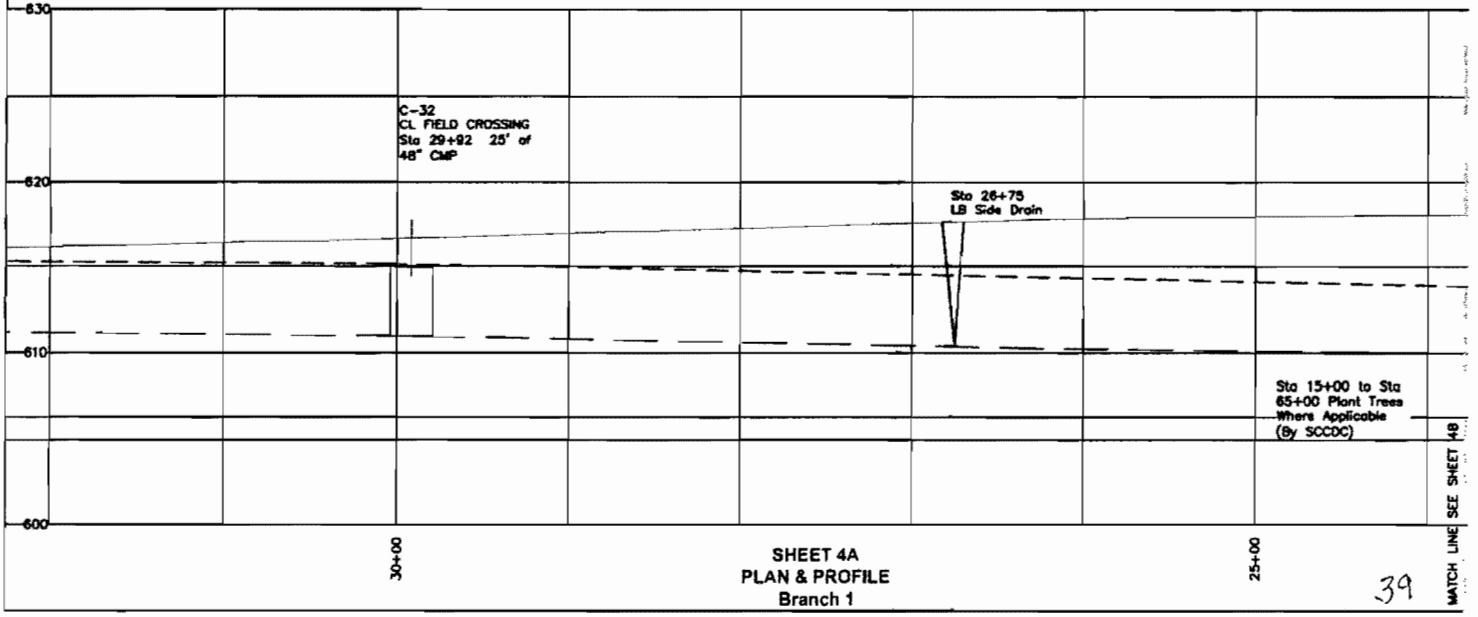
DATE: SEPTEMBER 10, 2010

PROJECT NO.: 04-1228

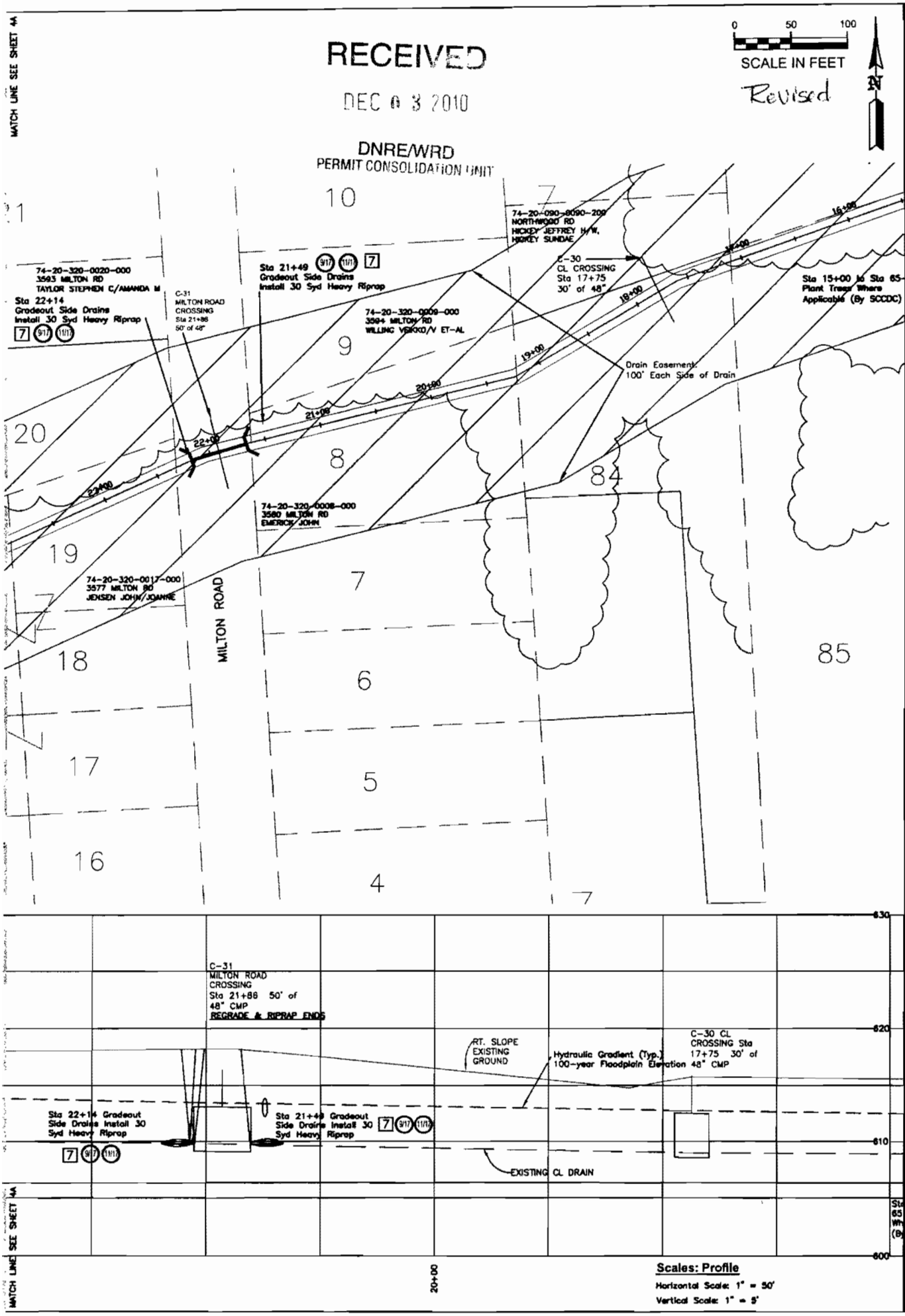
SHEET 3B
PLAN & PROFILE
Main Branch
Sta: 00+00 to 16+00

Revised





SHEET 4A
PLAN & PROFILE
Branch 1



901 Huron Ave. Suite B
Port Huron, MI 48060
PHONE: 810-985-0660
FAX: 810-985-0661
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT: **Gossman Drain**
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR:
Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS:
☐ PRELIMINARY
☐ FINAL
■ CONSTRUCTION

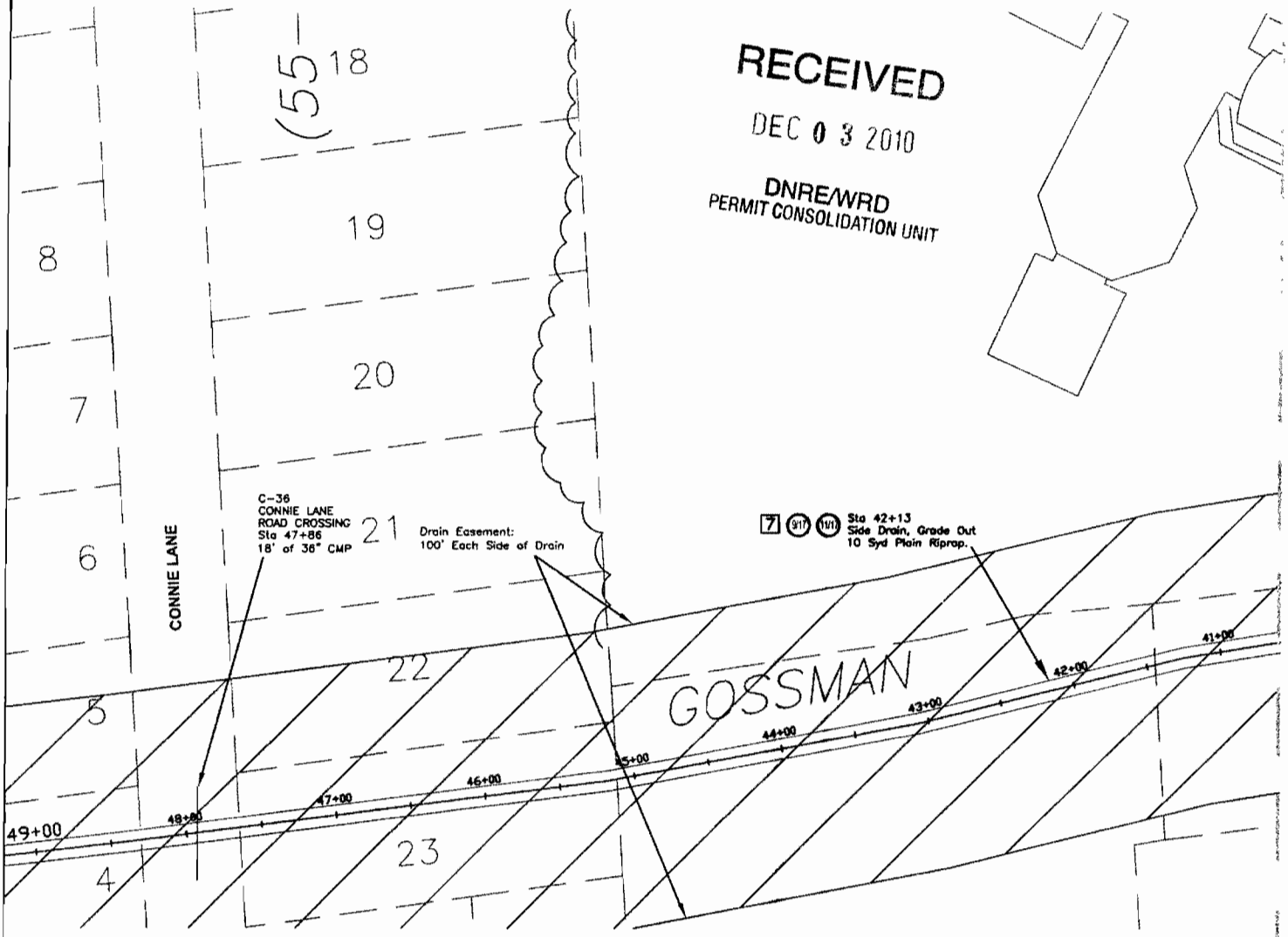
REVISION DATE:
1
2
3

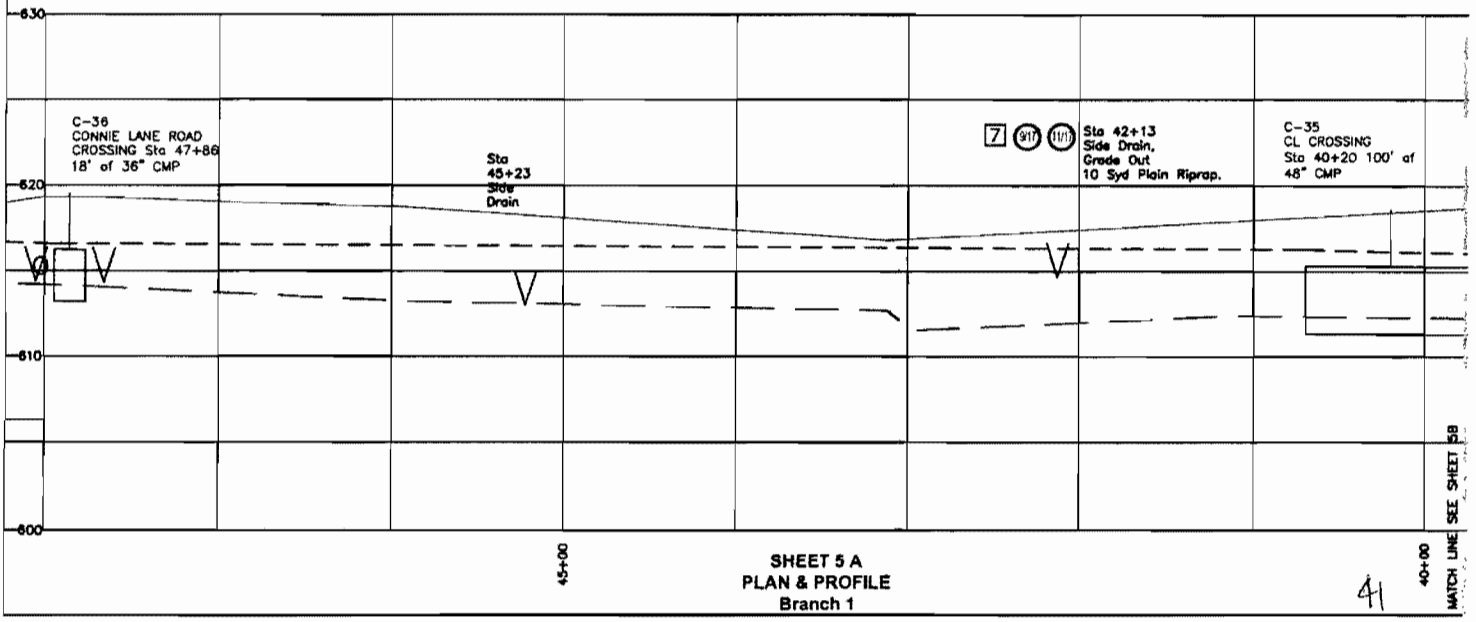
DATE: SEPTEMBER 10, 2010

PROJECT NO.: 04-1228

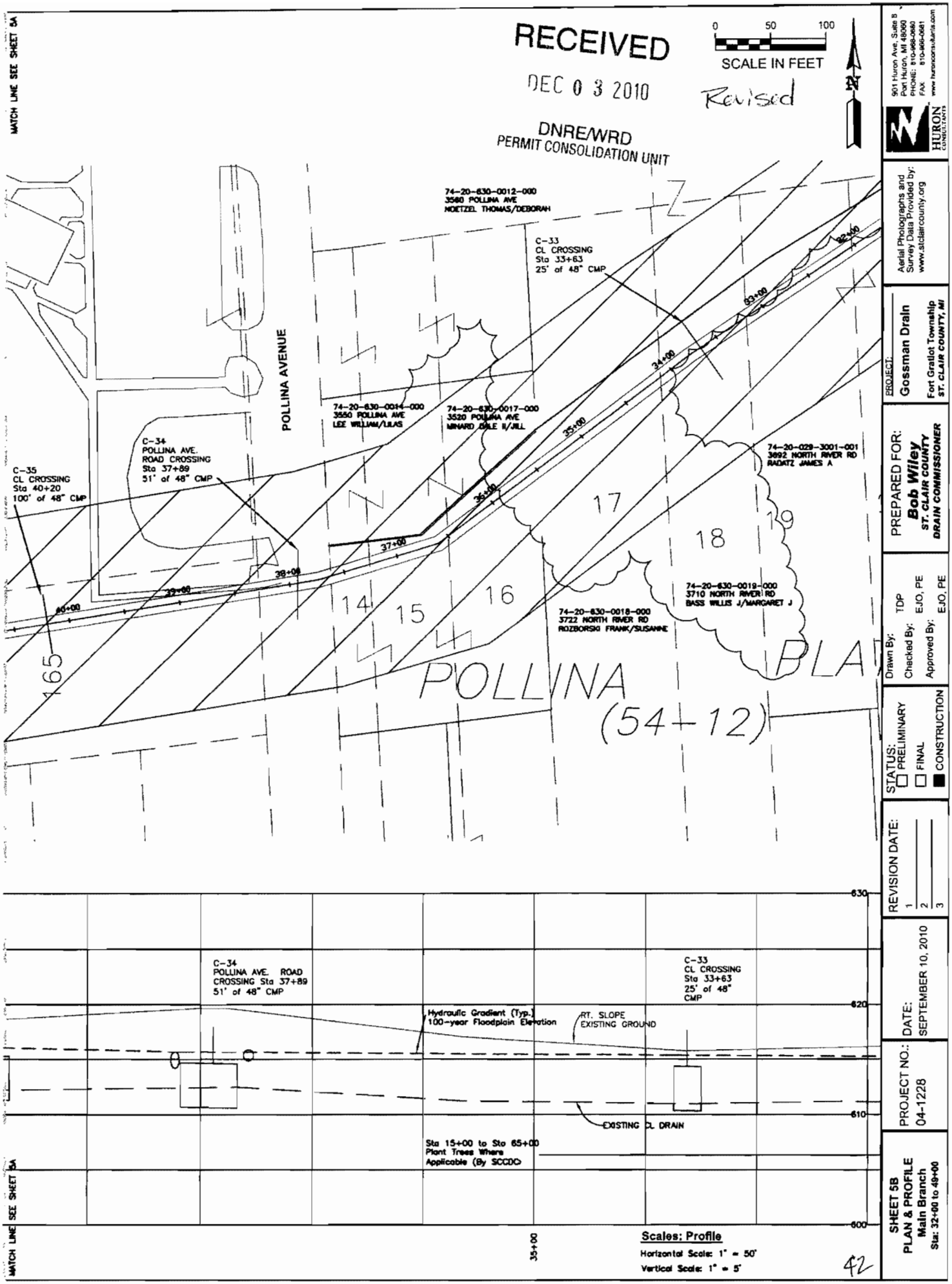
SHEET 4B
PLAN & PROFILE
Main Branch
Sta: 16+00 to 32+00

Revised

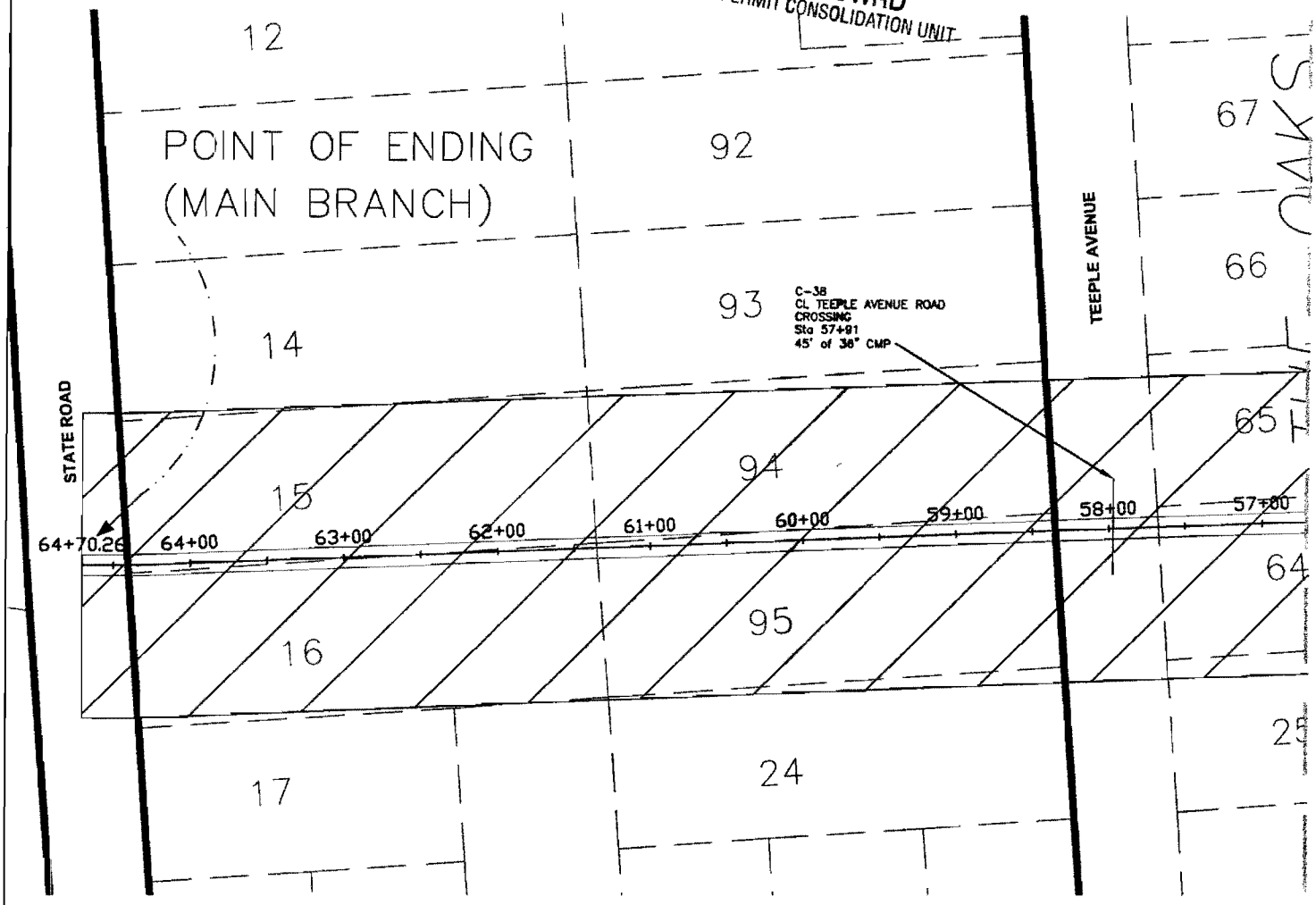


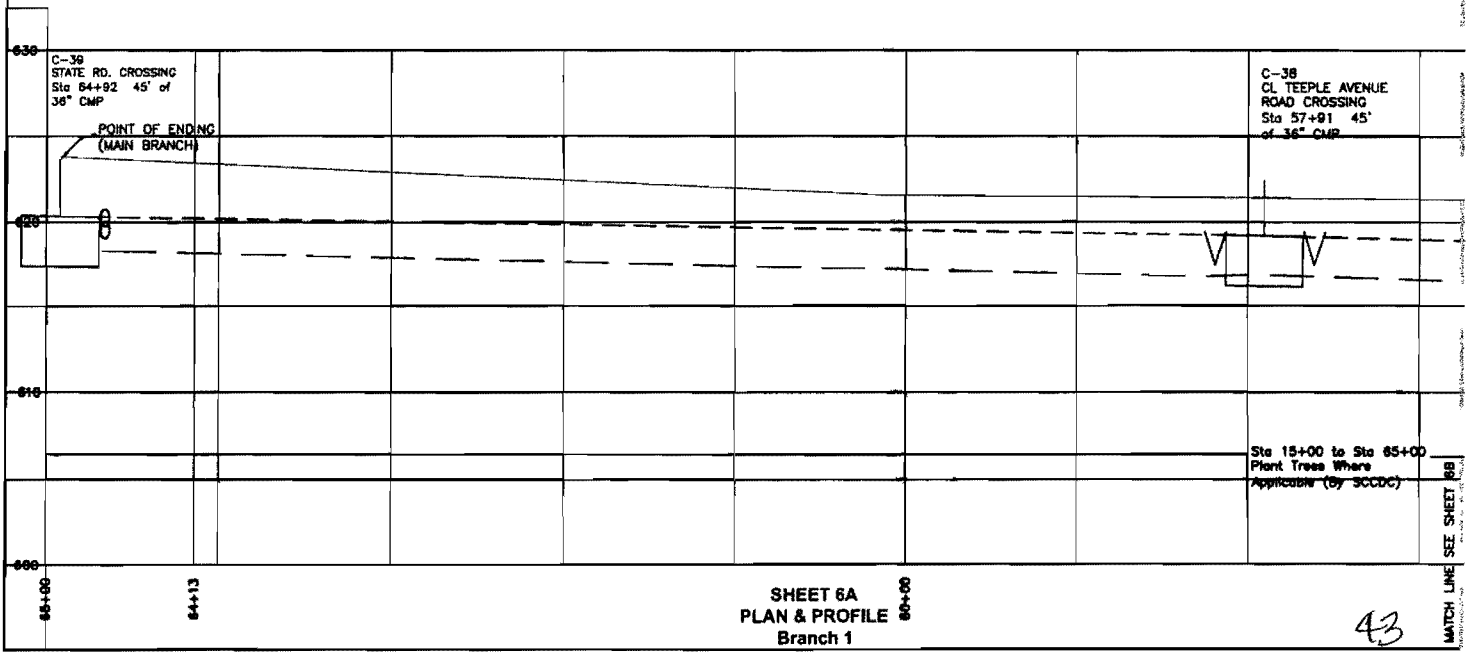


SHEET 5 A
PLAN & PROFILE
Branch 1

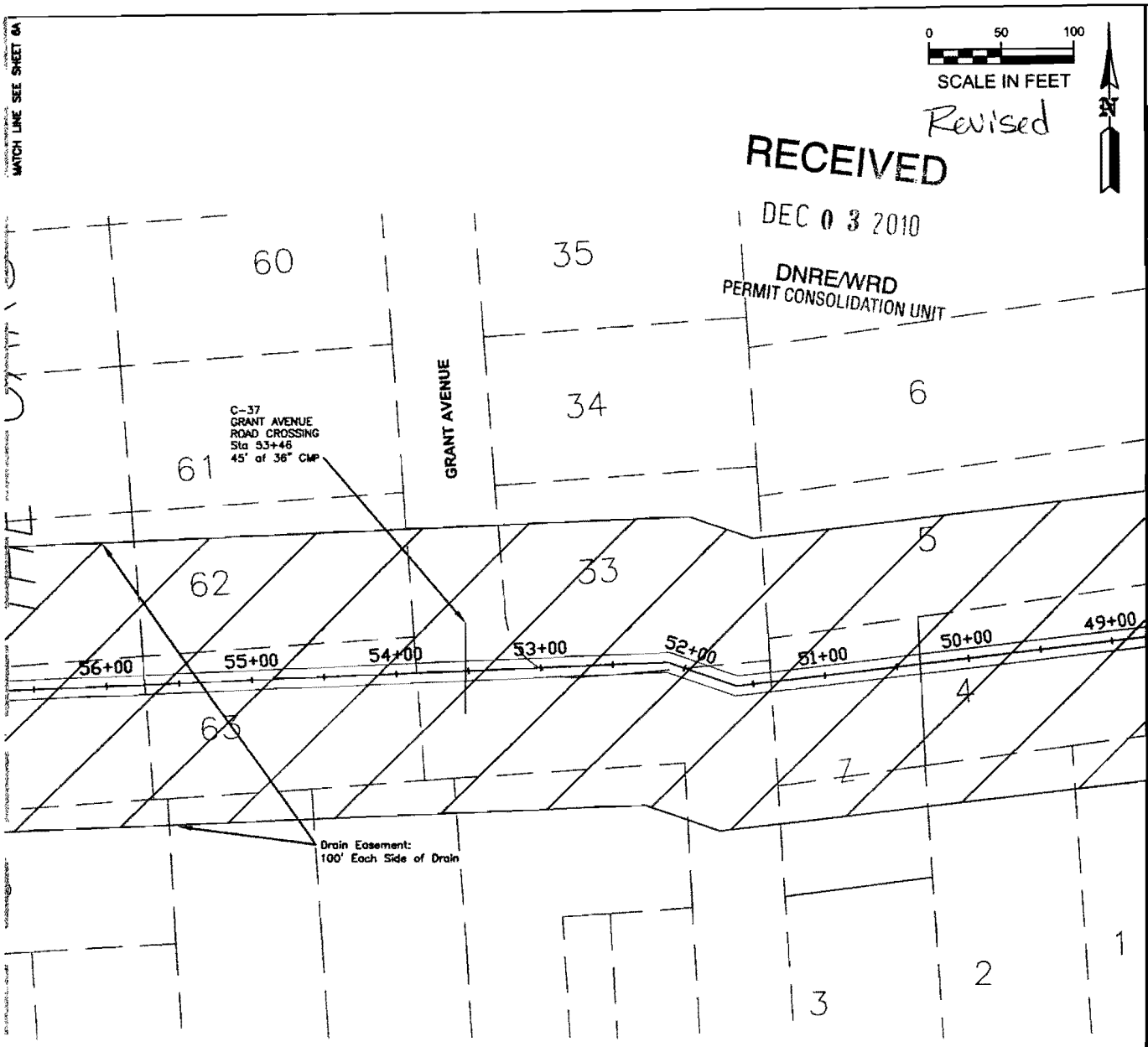

RECEIVED
DEC 0 3 2010
Revised
DNRE/WRD
PERMIT CONSOLIDATION UNIT
0 50 100
SCALE IN FEET
MATCH LINE SEE SHEET 5A
74-20-630-0012-000
3560 POLLINA AVE
NOETZEL THOMAS/DEBORAH
C-33
CL CROSSING
Sta 33+63
25' of 48" CMP
POLLINA AVENUE
74-20-630-0014-000
3550 POLLINA AVE
LEE WILLIAM/LILAS
74-20-630-0017-000
3520 POLLINA AVE
MINARD DALE II/JILL
C-34
POLLINA AVE.
ROAD CROSSING
Sta 37+89
51' of 48" CMP
C-35
CL CROSSING
Sta 40+20
100' of 48" CMP
74-20-029-3001-001
3692 NORTH RIVER RD
RADATZ JAMES A
74-20-630-0019-000
3710 NORTH RIVER RD
BASS WILLIS J/MARGARET J
74-20-630-0018-000
3722 NORTH RIVER RD
ROZBORSKI FRANK/SUSANNE
POLLINA
(54+12)
C-34
POLLINA AVE. ROAD
CROSSING Sta 37+89
51' of 48" CMP
C-33
CL CROSSING
Sta 33+63
25' of 48"
CMP
Hydraulic Gradient (Typ.)
100-year Floodplain Elevation
RT. SLOPE
EXISTING GROUND
EXISTING CL DRAIN
Sta 15+00 to Sta 65+00
Plant Trees Where
Applicable (By SCCDC)
630
620
610
600
35+00
Scales: Profile
Horizontal Scale: 1" = 50'
Vertical Scale: 1" = 5'
MATCH LINE SEE SHEET 5A
42
901 Huron Ave, Suite B
Port Huron, MI 48060
PHONE: 810-966-0680
FAX: 810-966-0681
www.huronconsultants.com
HURON CONSULTANTS
Aerial Photographs and Survey Data Provided by: www.stclairccounty.org
PROJECT:
Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI
PREPARED FOR:
Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER
Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE
STATUS:
☐ PRELIMINARY
☐ FINAL
■ CONSTRUCTION
REVISION DATE:
1
2
3
DATE: SEPTEMBER 10, 2010
PROJECT NO.: 04-1228
SHEET 5B
PLAN & PROFILE
Main Branch
Sta: 32+00 to 49+00

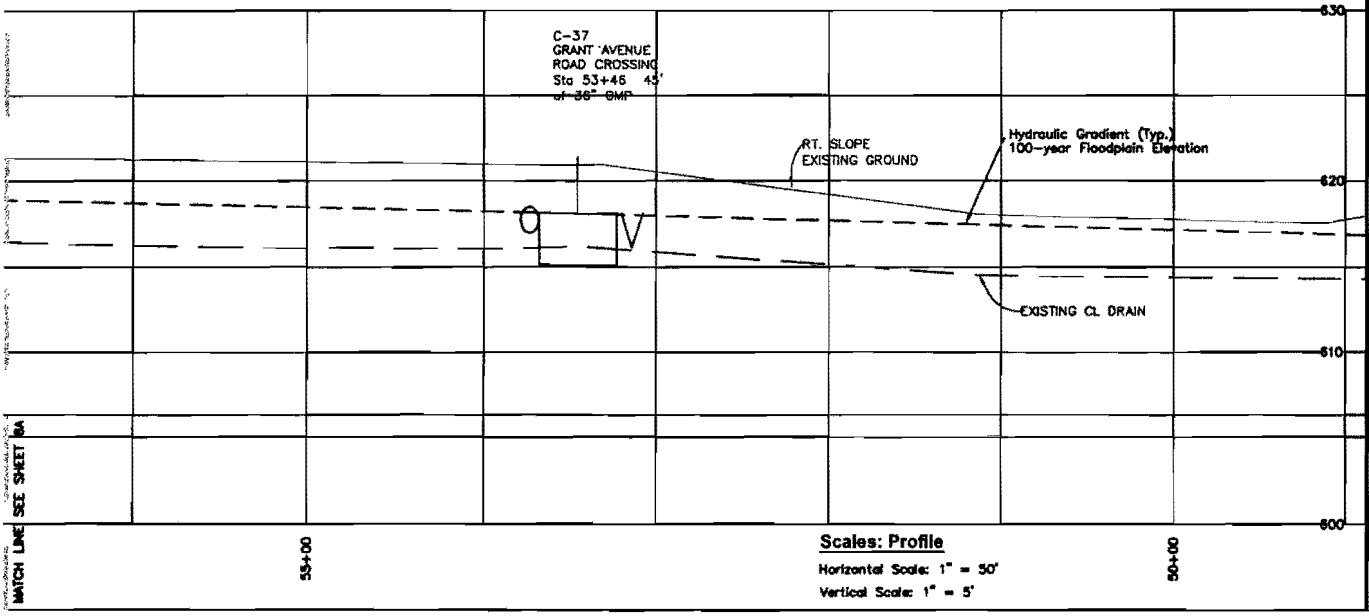
Revised





SHEET 6A
PLAN & PROFILE
Branch 1





MATCH LINE SEE SHEET 6A

MATCH LINE SEE SHEET 6A

901 Huron Ave, Suite 8
Port Huron, MI 48060
PHONE: 810-966-0680
FAX: 810-966-0681
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT: Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR: Bob Wiley
ST. CLAIR COUNTY DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS:
☐ PRELIMINARY
☐ FINAL
■ CONSTRUCTION

REVISION DATE:
1
2
3

DATE: SEPTEMBER 10, 2010

PROJECT NO.: 04-1228

SHEET 6B
PLAN & PROFILE
Main Branch
Sta: 49+00 to 65+00

44

Revised

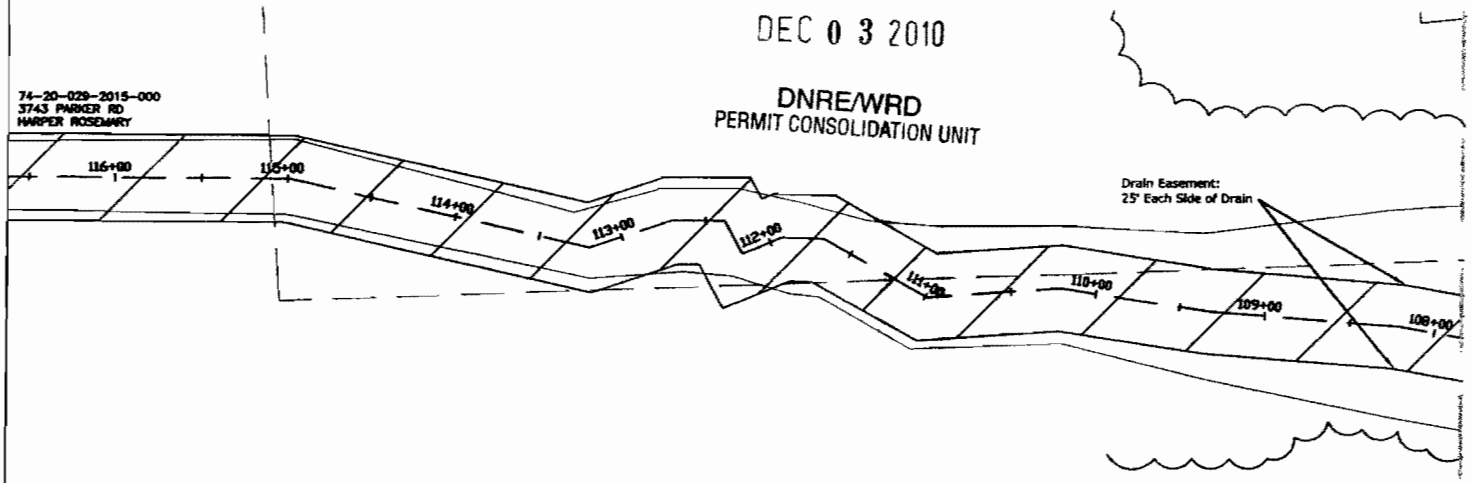
RECEIVED

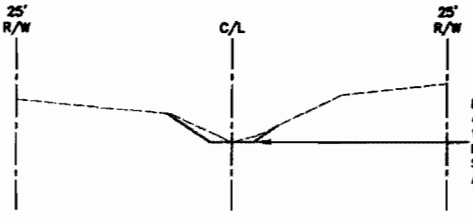
DEC 0 3 2010

DNRE/WRD
PERMIT CONSOLIDATION UNIT

MATCH LINE SEE SHEET 7B

74-20-029-2015-000
3743 PARKER RD
HARPER ROSEMARY

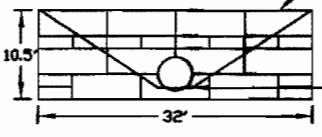




Excavate Channel
4' Wide Bottom
1.5:1 Side Slopes
Restore 3" Topsoil,
Seed & Mulch Blanket
All Surfaces (Typ) 3 #17

Cross Section Detail

Sta 105+87 to 106+07
Not To Scale

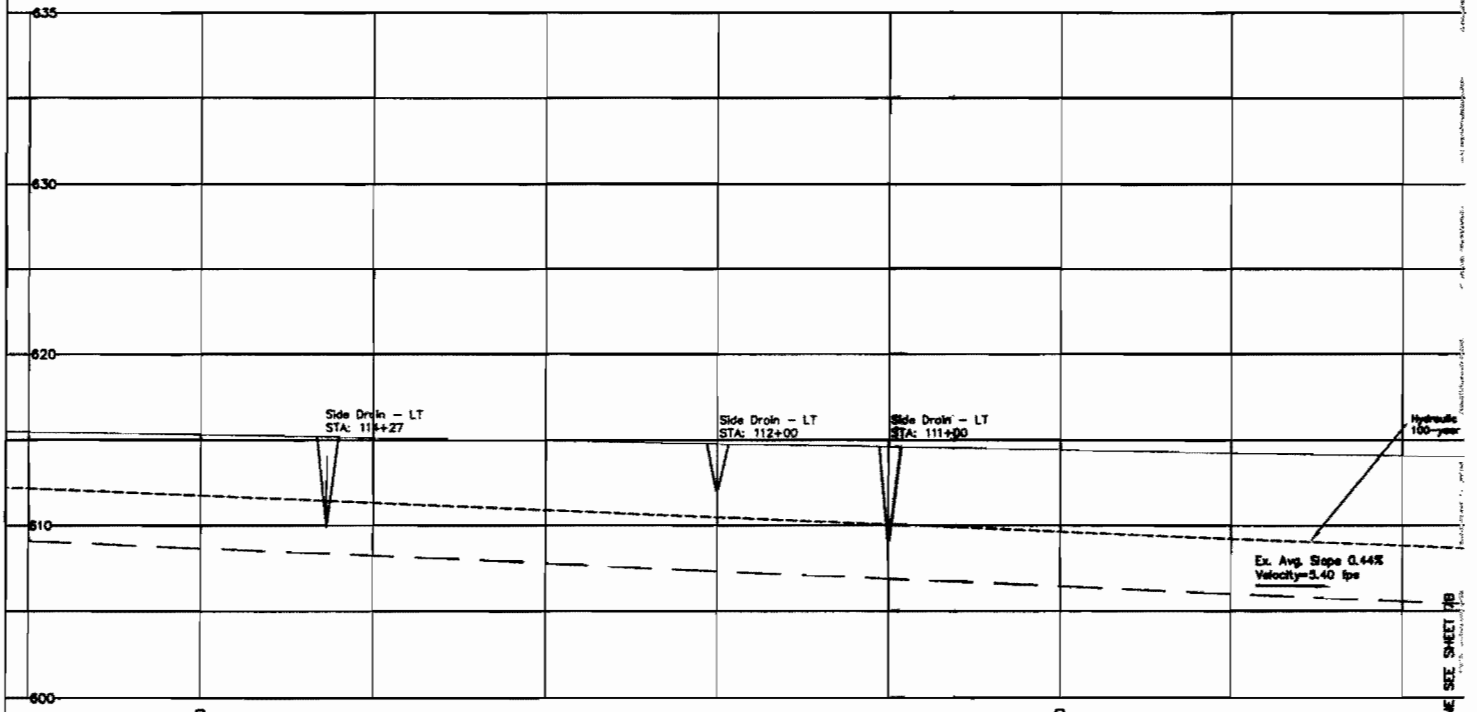


Mock Industries Stone Strong or
Equal as Approved by SCCDC.
12" Toed Into Bottom. (Typ)

4' Wide Bottom, 1.5:1 Side Slopes
48"CMP, Invert 4" Below Channel.
Gradeout Side Drains. 40 Syd Heavy Riprap Each End.
Restore 3" Topsoil, Seed & Mulch Blanket All Surfaces.
(Typ) 3 #17

Headwall Detail

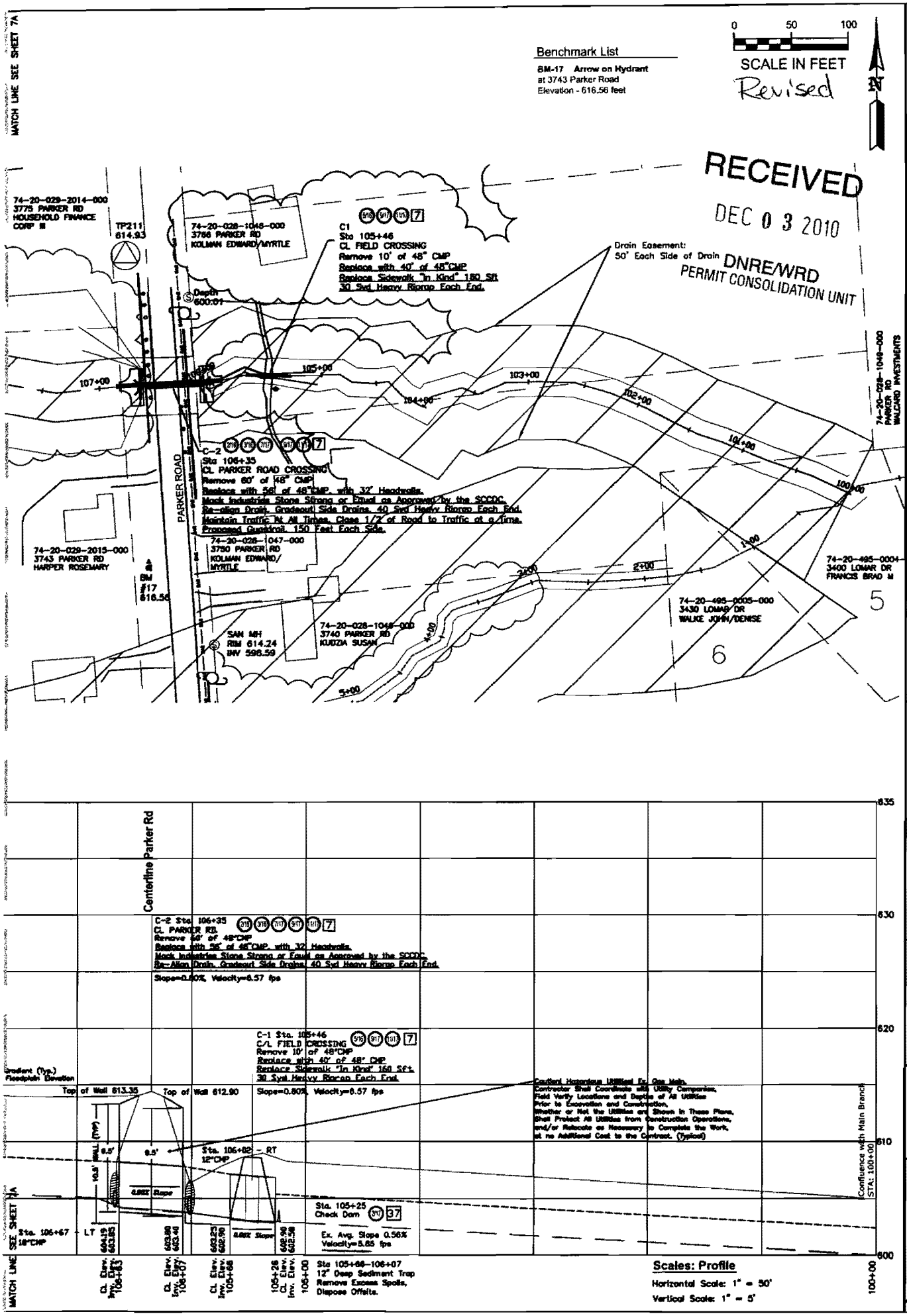
Sta 06+20 & 06+76
Not To Scale

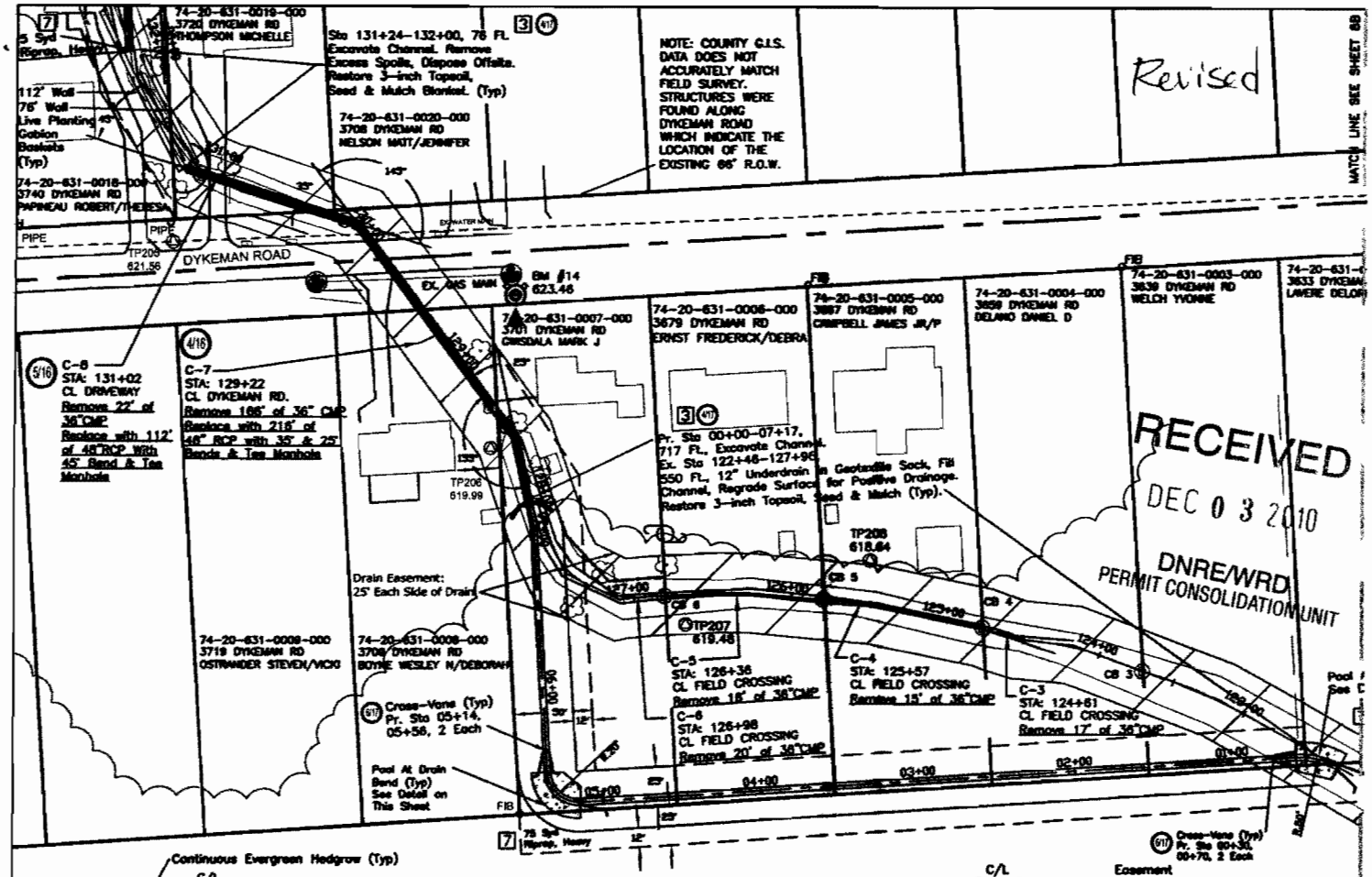


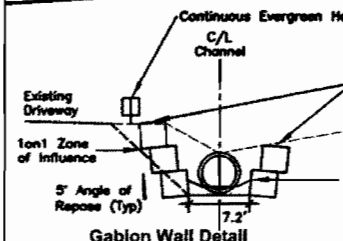
MATCH LINE SEE SHEET 7B

SHEET 7A
PLAN & PROFILE
Branch 1

45

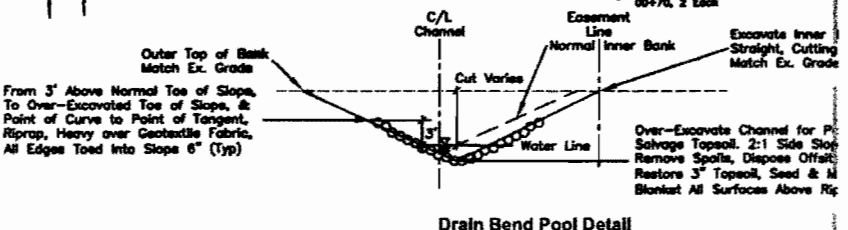

MATCH LINE SEE SHEET 7A
Benchmark List
BM-17 Arrow on Hydrant
at 3743 Parker Road
Elevation - 616.56 feet
0 50 100
SCALE IN FEET
Revised
RECEIVED
DEC 0 3 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT
74-20-029-2014-000
3775 PARKER RD
HOUSEHOLD FINANCE CORP III
TP211
614.93
74-20-028-1048-000
3766 PARKER RD
KOLMAN EDWARD/MYRTLE
C1
Sta 105+46
CL FIELD CROSSING
Remove 10' of 48" CMP
Replace with 40' of 48"CMP
Replace Sidewalk "In Kind" 160 SF
30 Syd Heavy Riprap Each End.
Drain Easement:
50' Each Side of Drain
Depth
600.01
107+00
105+00
104+00
103+00
102+00
101+00
100+00
74-20-028-1048-000
PARKER RD
WALDARO INVESTMENTS
C-2
Sta 106+35
CL PARKER ROAD CROSSING
Remove 60' of 48" CMP
Replace with 56' of 48"CMP, with 32' Headwalls.
Mack Industries Stone Strong or Equal as Approved by the SCCDC.
Re-align Drain, Gradeout Side Drains, 40 Syd Heavy Riprap Each End.
Maintain Traffic At All Times, Close 1/2 of Road to Traffic at a Time.
Provided Guardrail, 150 Feet Each Side.
PARKER ROAD
74-20-028-047-000
3750 PARKER RD
KOLMAN EDWARD/MYRTLE
74-20-029-2015-000
3743 PARKER RD
HARPER ROSEMARY
BM #17 616.56
SAN MH
RIM 614.24
INV 596.59
74-20-028-1048-000
3740 PARKER RD
KUDZIA SUSAN
4+00
3+00
2+00
1+00
74-20-495-0004-000
3400 LOMAR DR
FRANCIS BRAD M
74-20-495-0005-000
3430 LOMAR DR
WALKE JOHN/DENISE
5
6
Centerline Parker Rd
C-2 Sta 106+35
CL PARKER RD.
Remove 56' of 48"CMP
Replace with 56' of 48"CMP, with 32' Headwalls.
Mack Industries Stone Strong or Equal as Approved by the SCCDC.
Re-Align Drain, Gradeout Side Drains, 40 Syd Heavy Riprap Each End.
Slope=0.80%, Velocity=6.57 fps
C-1 Sta. 105+46
C/L FIELD CROSSING
Remove 10' of 48"CMP
Replace with 40' of 48" CMP
Replace Sidewalk "In Kind" 160 Sf's.
30 Syd Heavy Riprap Each End.
Gradient (Typ.)
Floodplain Elevation
Top of Wall 613.35
Top of Wall 612.90
Slope=0.80%, Velocity=6.57 fps
Caution! Hazardous Utilities! Ex. Gas Main.
Contractor Shall Coordinate with Utility Companies,
Field Verify Locations and Depths of All Utilities
Prior to Excavation and Construction,
Whether or Not the Utilities are Shown in These Plans.
Shall Protect All Utilities from Construction Operations,
and/or Relocate as Necessary to Complete the Work,
at no Additional Cost to the Contract. (Typical)
(TYP)
9.5'
9.5'
10.5'
6.66% Slope
Sta. 106+02 - RT
12"CMP
6.66% Slope
Sta. 105+25
Check Dam
Ex. Avg. Slope 0.56%
Velocity=5.65 fps
(Confluence with Main Branch)
STA: 100+00
SEE SHEET 7A
Sta. 106+67 - LT
18"CMP
Cl. Elev. 604.19
Inv. Elev. 603.85
Cl. Elev. 603.80
Inv. Elev. 603.46
Cl. Elev. 603.25
Inv. Elev. 602.90
Cl. Elev. 603.90
Inv. Elev. 602.56
Cl. Elev.
Inv. Elev.
106+83
106+07
105+68
105+28
105+00
100+00
Sta 105+66-106+07
12" Deep Sediment Trap
Remove Excess Spoils,
Dispose Offsite.
635
630
620
610
600
Scales: Profile
Horizontal Scale: 1" = 50'
Vertical Scale: 1" = 5'
MATCH LINE SEE SHEET 7A
SHEET 7B
PLAN & PROFILE
Branch 1
Sta: 100+00 to 116+00
PROJECT NO.: 04-1228
DATE: SEPTEMBER 10, 2010
REVISION DATE: 1 2 3
STATUS: PRELIMINARY FINAL CONSTRUCTION
Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE
PREPARED FOR:
Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER
PROJECT:
Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI
Aerial Photographs and Survey Data Provided by: www.stclaircounty.org
901 Huron Ave, Suite 8
Port Huron, MI 48060
PHONE: 810-988-0580
FAX: 810-988-0681
www.huronconsultants.com
HURON CONSULTANTS
46





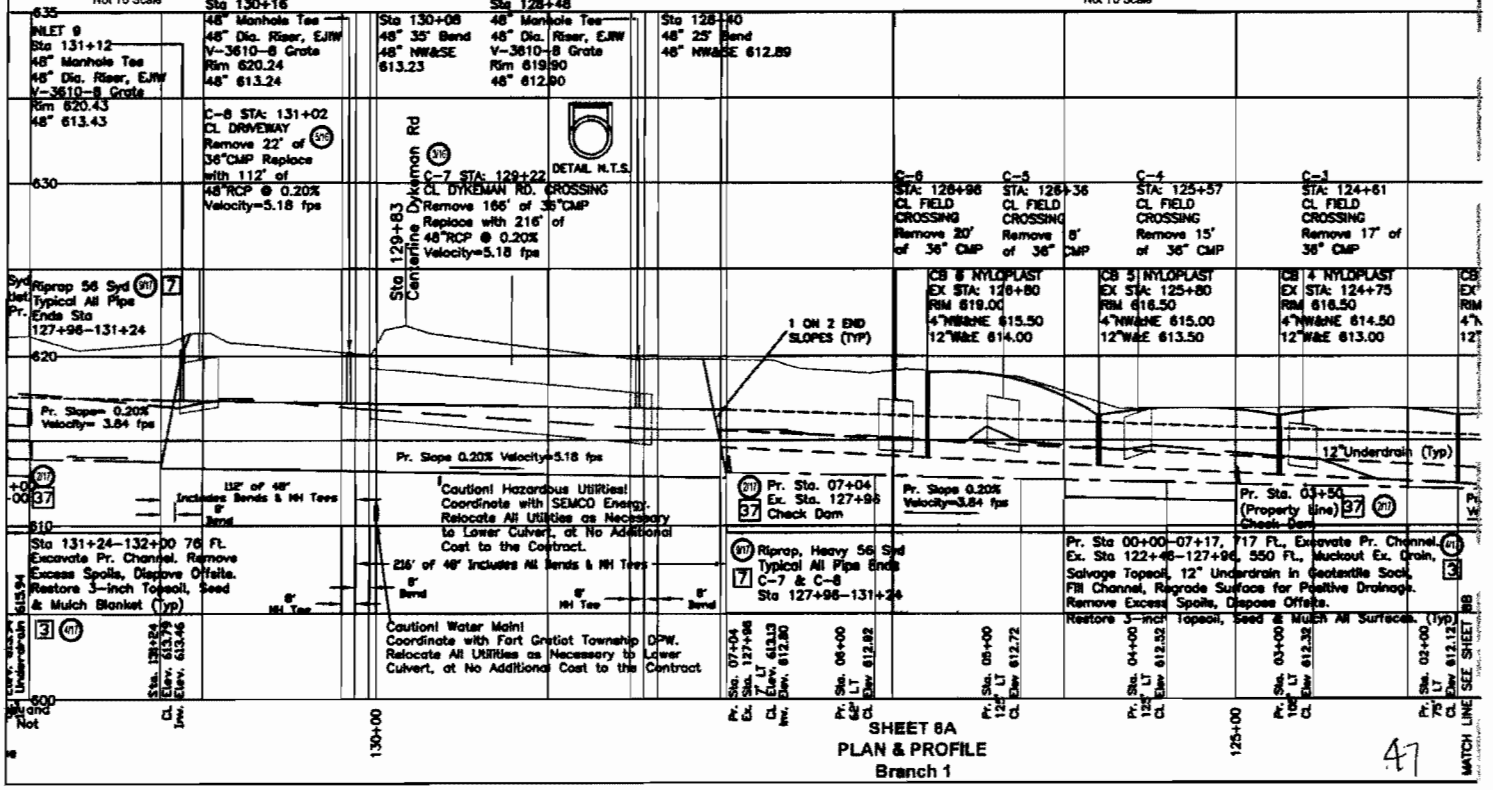
Gabion Wall Detail

Ex. 131+20-132+32
Not To Scale

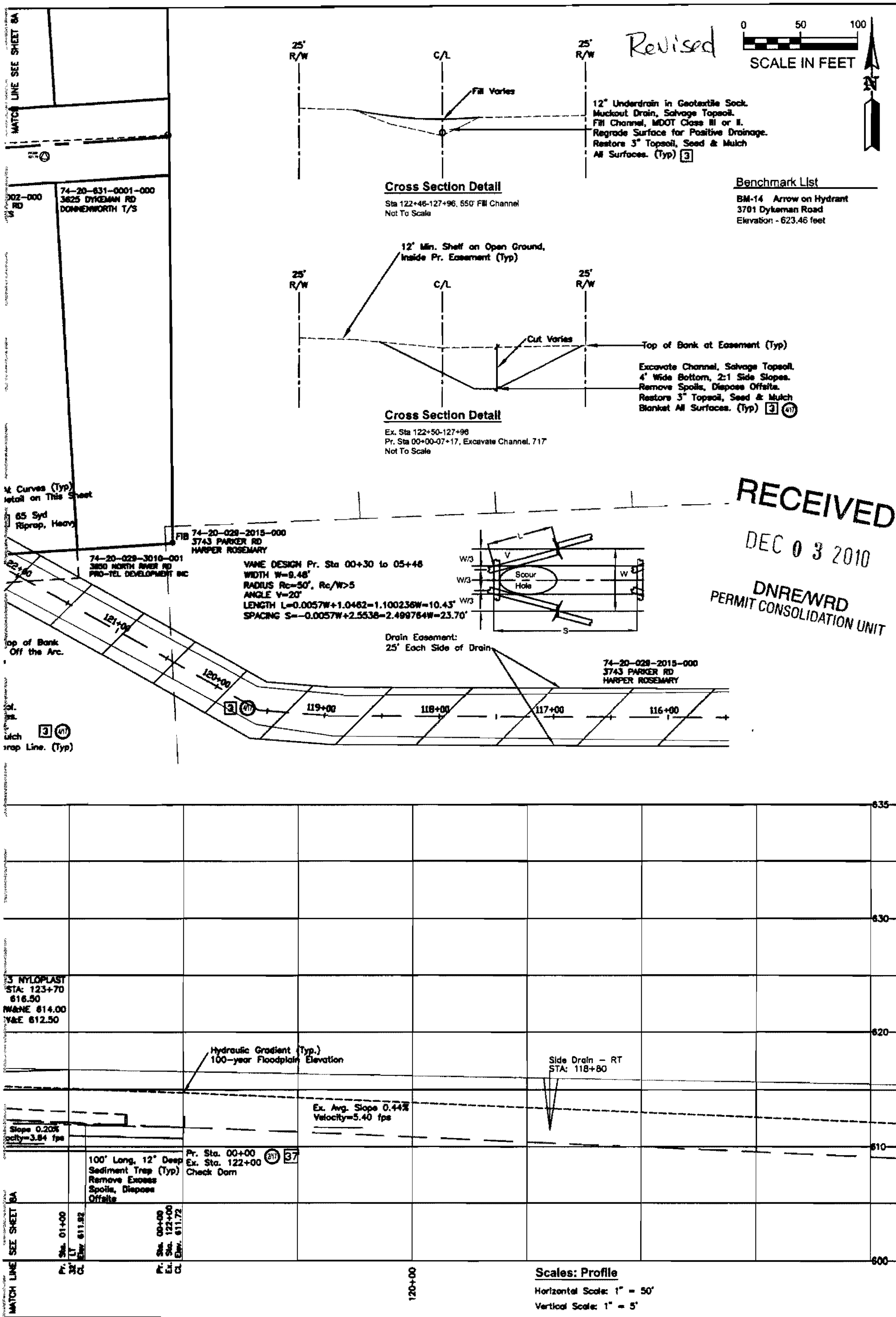


Drain Bend Pool Detail

Pr. Sta 00+30-00+60, 05+14-05+46
Not To Scale



SHEET 8A
PLAN & PROFILE
Branch 1



901 Huron Ave, Suite 8
Port Huron, MI 48060
PHONE: 810-966-0680
FAX: 810-966-0681
www.huronconsultants.com

HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by:
www.stclaircounty.org

PROJECT: Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR: Bob Wiley
ST. CLAIR COUNTY DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS:
☐ PRELIMINARY
☐ FINAL
■ CONSTRUCTION

REVISION DATE:
1
2
3

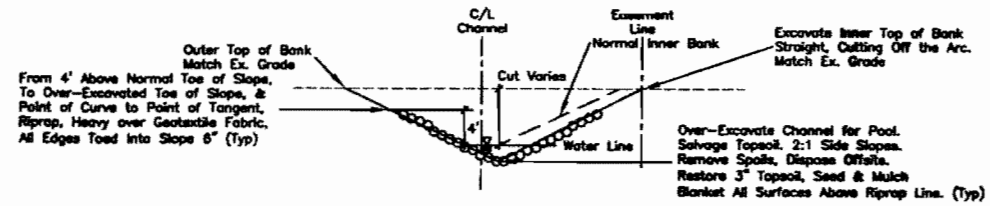
DATE: SEPTEMBER 10, 2010

PROJECT NO.: 04-1228

SHEET 8B
PLAN & PROFILE
Branch 1
Sta: 116+00 to 132+00

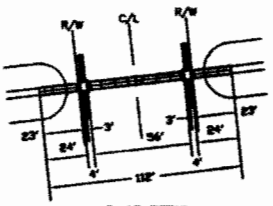
48

Revised

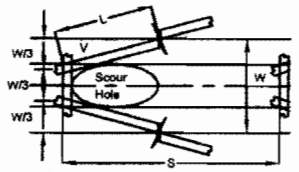


Drain Bend Pool Detail

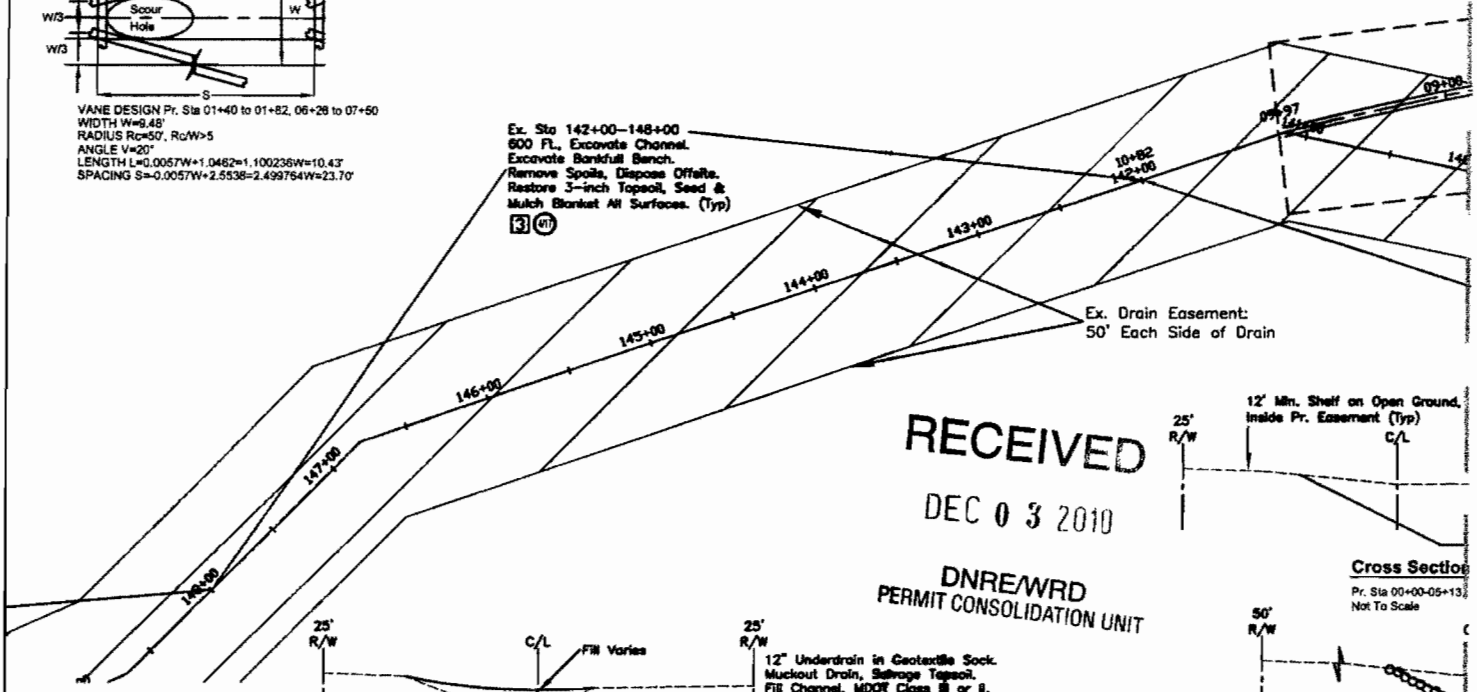
Pr. Sta 01+40-01+72
Not To Scale



C-13 DETAIL
104' 48"RCP
W/ 2 EACH
7' DIA. CB

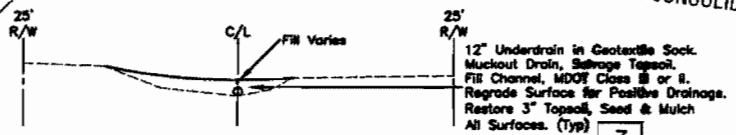


VANE DESIGN Pr. Sta 01+40 to 01+82, 06+26 to 07+50
WIDTH W=9.48'
RADIUS Rc=50', Rc/W>5
ANGLE V=20°
LENGTH L=0.0057W+1.0462=1.100236W=10.43'
SPACING S=-0.0057W+2.5538=2.499764W=23.70'



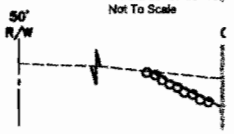
RECEIVED
DEC 0 3 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

Cross Sectio
Pr. Sta 00+00-05+13
Not To Scale

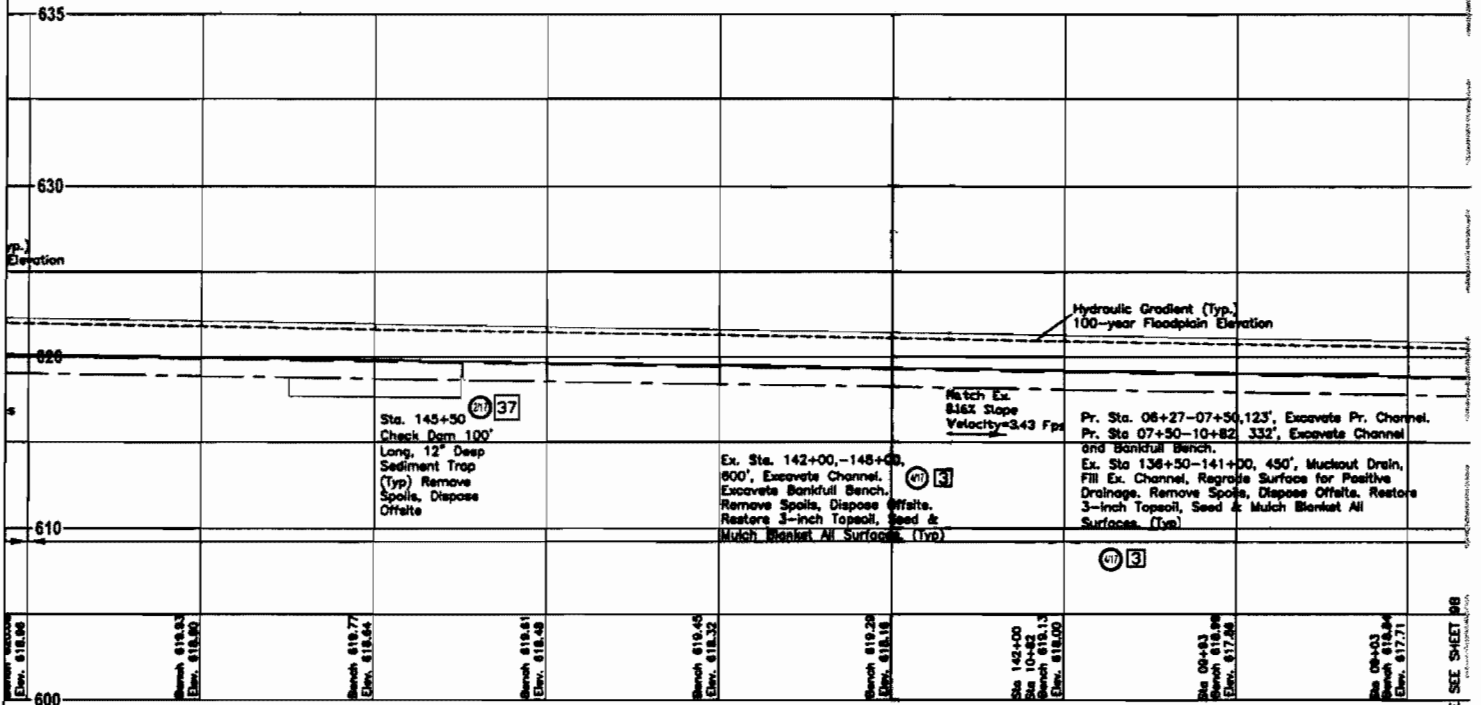


Cross Section Detail

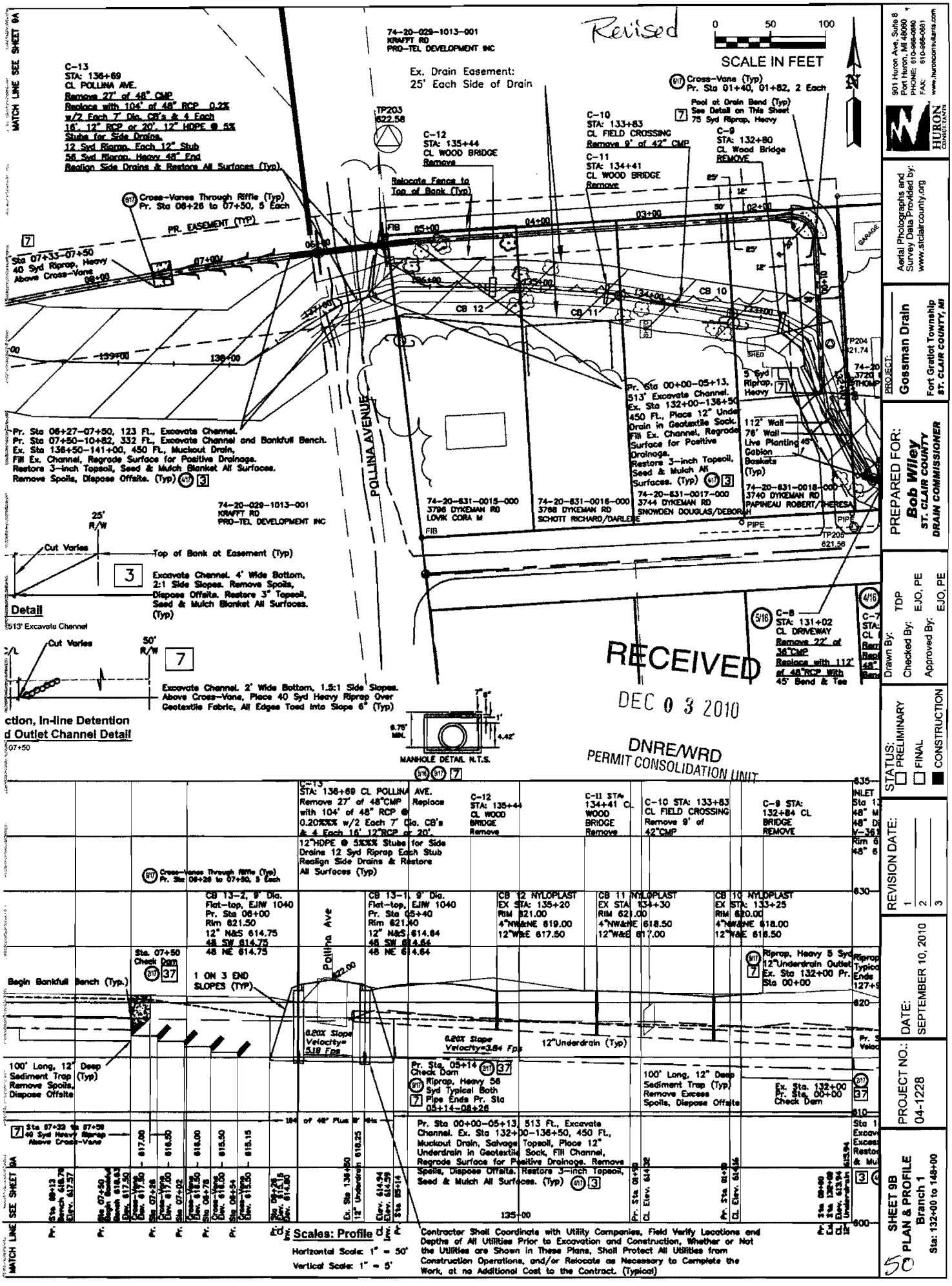
Sta 132+00-136+50, 450' Fill Channel
Not To Scale



Cross Se
Restricte
Pr. Sta 07+33
Not To Scale



SHEET 9A
PLAN & PROFILE
Branch 1



901 Huron Ave, Suite 8
Port Huron, MI 48060
PHONE: 810-966-0880
FAX: 810-966-0881
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT: **Gossman Drain** Fort Gratiot Township ST. CLAIR COUNTY, MI

PREPARED FOR: **Bob Wiley** ST. CLAIR COUNTY DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS: ☐ PRELIMINARY ☐ FINAL ■ CONSTRUCTION

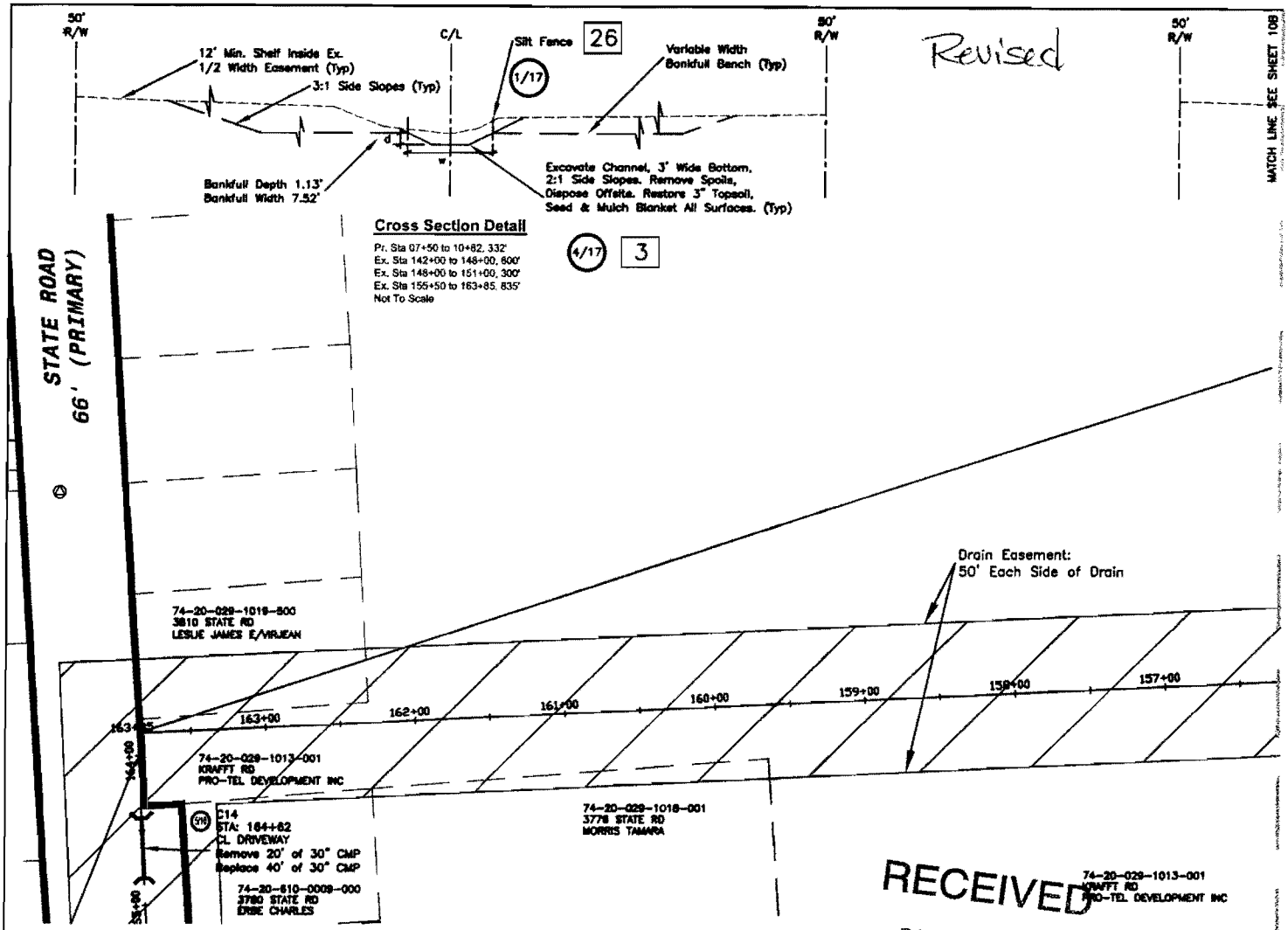
REVISION DATE: 1 2 3

DATE: SEPTEMBER 10, 2010

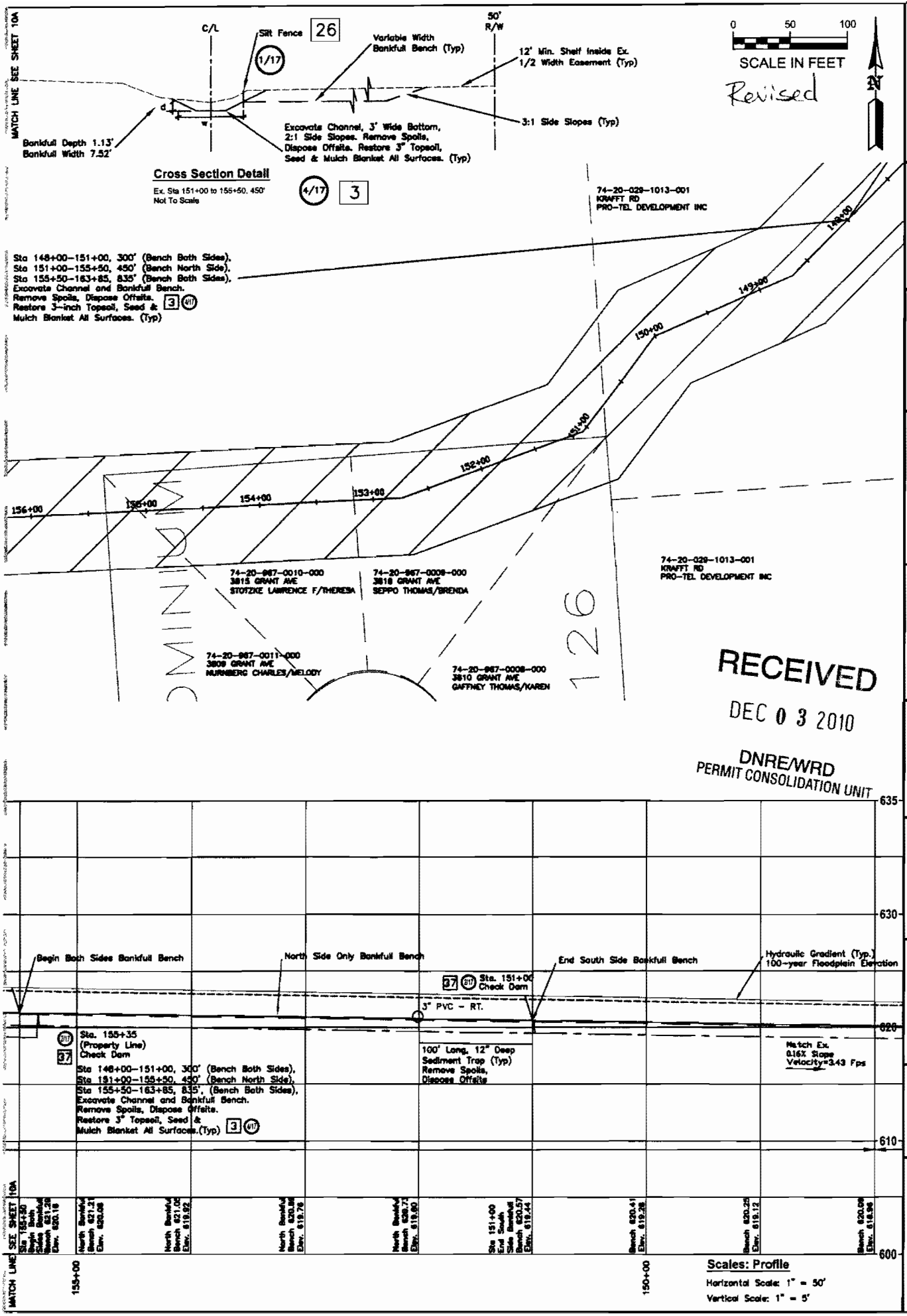
PROJECT NO.: 04-1228

SHEET 9B
PLAN & PROFILE
Branch 1
Sta: 132+00 to 148+00

50



SHEET 10A
PLAN & PROFILE
Branch 1



901 Huron Ave, Suite 8
Port Huron, MI 48060
PHONE: 810-966-0660
FAX: 810-966-0681
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT:
Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR:
Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS:
☐ PRELIMINARY
☐ FINAL
■ CONSTRUCTION

REVISION DATE:
1
2
3

DATE: SEPTEMBER 10, 2010

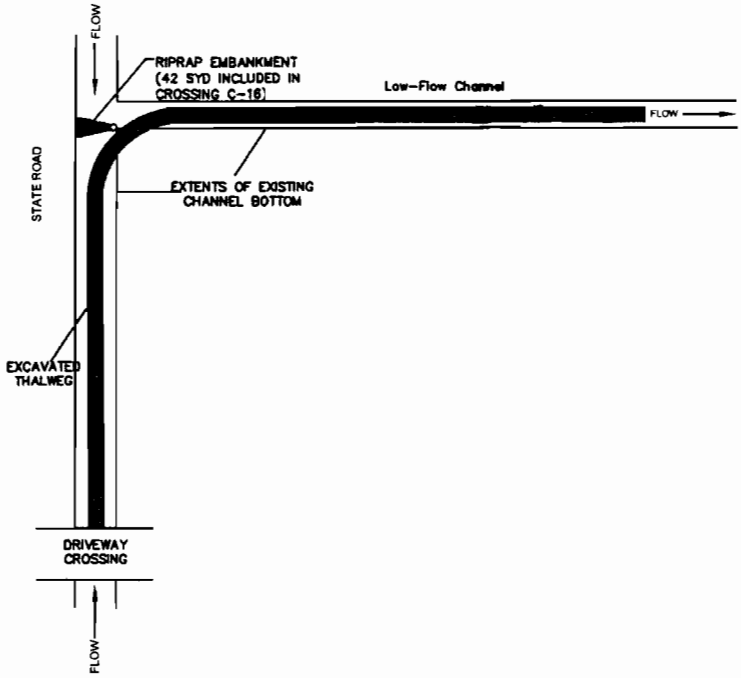
PROJECT NO.: 04-1228

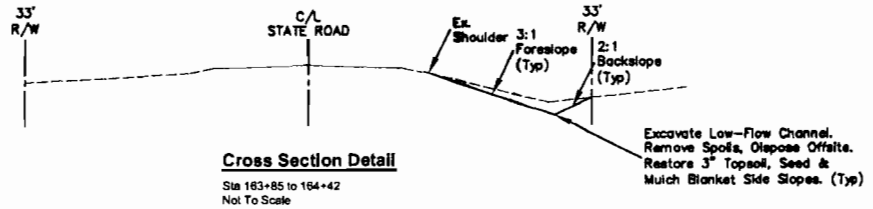
SHEET 10B
PLAN & PROFILE
Branch 1
Sta: 148+00 to 163+85

52

Revised

MATCH LINE SEE SHEET 11B





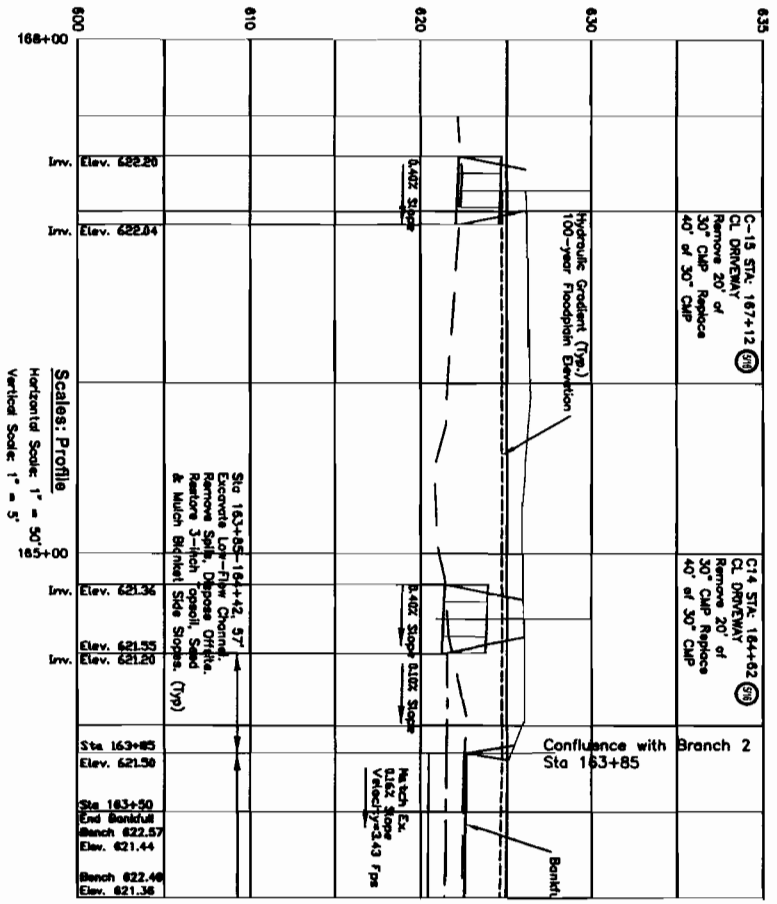
Cross Section Detail

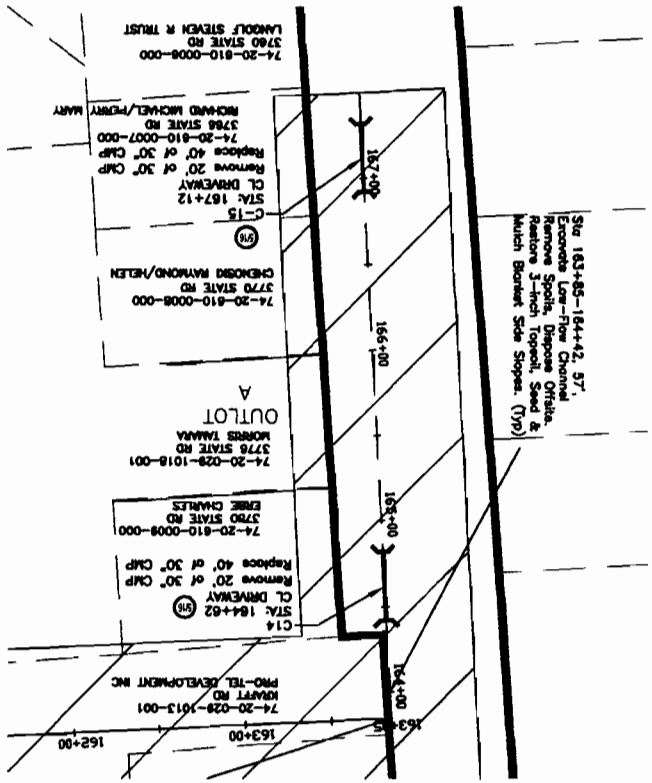
Sta 163+85 to 164+42
Not To Scale

SHEET 11A
PLAN & PROFILE
Branch 1

MATCH LINE SEE SHEET 11B

MATCH LINE SEE SHEET 11A





RECEIVED
DEC 03 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

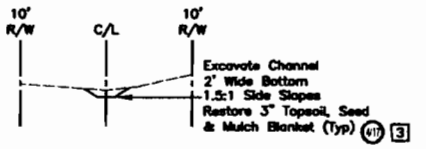
Revised

54

SHEET 11B PLAN & PROFILE Branch 1 Sta: 163+85 to 168+00	PROJECT NO.: 04-1228	DATE: SEPTEMBER 10, 2010	REVISION DATE: 1 2 3	STATUS: ☐ PRELIMINARY ☐ FINAL ■ CONSTRUCTION	Drawn By: TDP Checked By: EJO, PE Approved By: EJO, PE	PREPARED FOR: **Bob Wiley** **ST. CLAIR COUNTY** **DRAIN COMMISSIONER**	PROJECT: **Gossman Drain** Fort Gratiot Township **ST. CLAIR COUNTY, MI**	Aerial Photographs and Survey Data Provided by: www.stclaircounty.org	HURON CONSULTANTS 901 Huron Ave, Suite 8 Port Huron, MI 48060 PHONE: 810-966-0680 FAX: 810-966-0681 www.huronconsultants.com

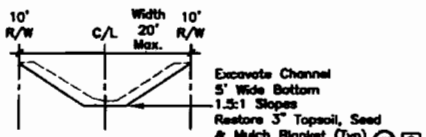
MATCH LINE SEE SHEET 11A

Revised



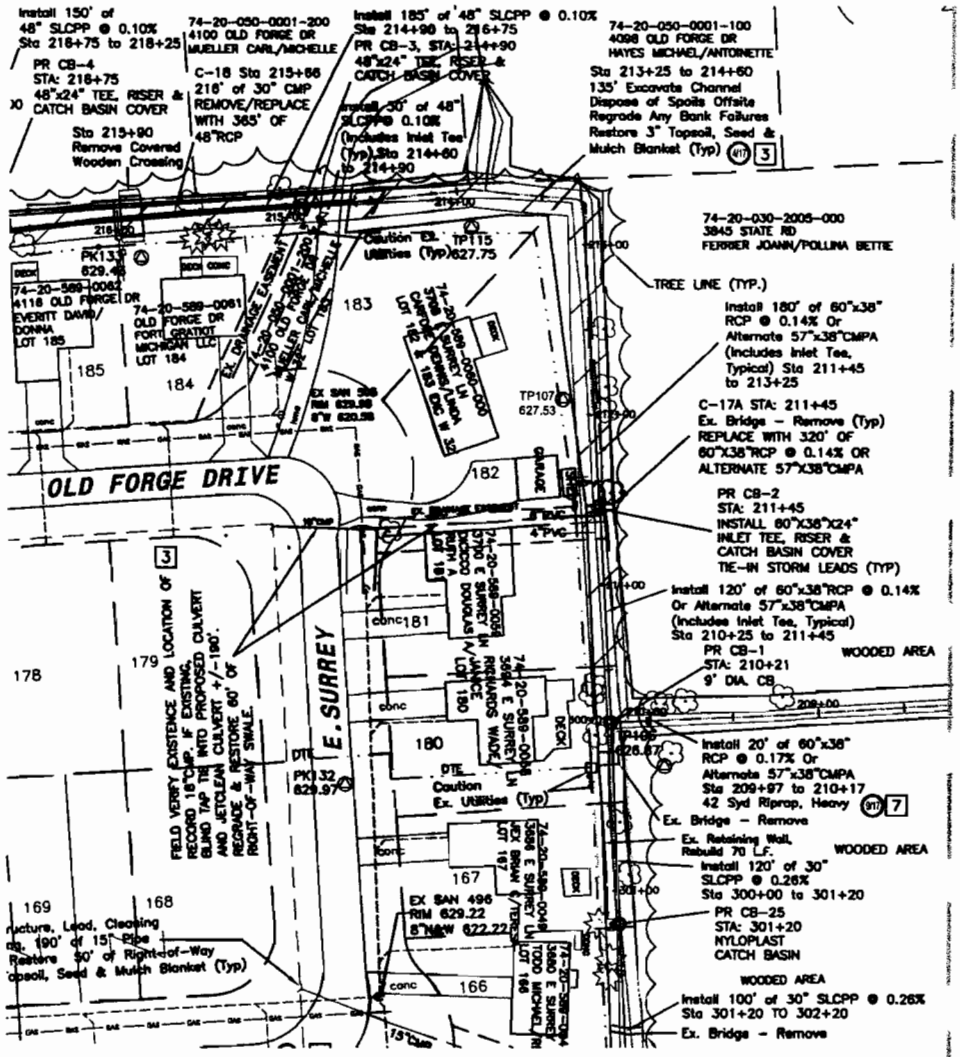
Cross Section Detail

Sta 213+25 to 214+60
Not To Scale

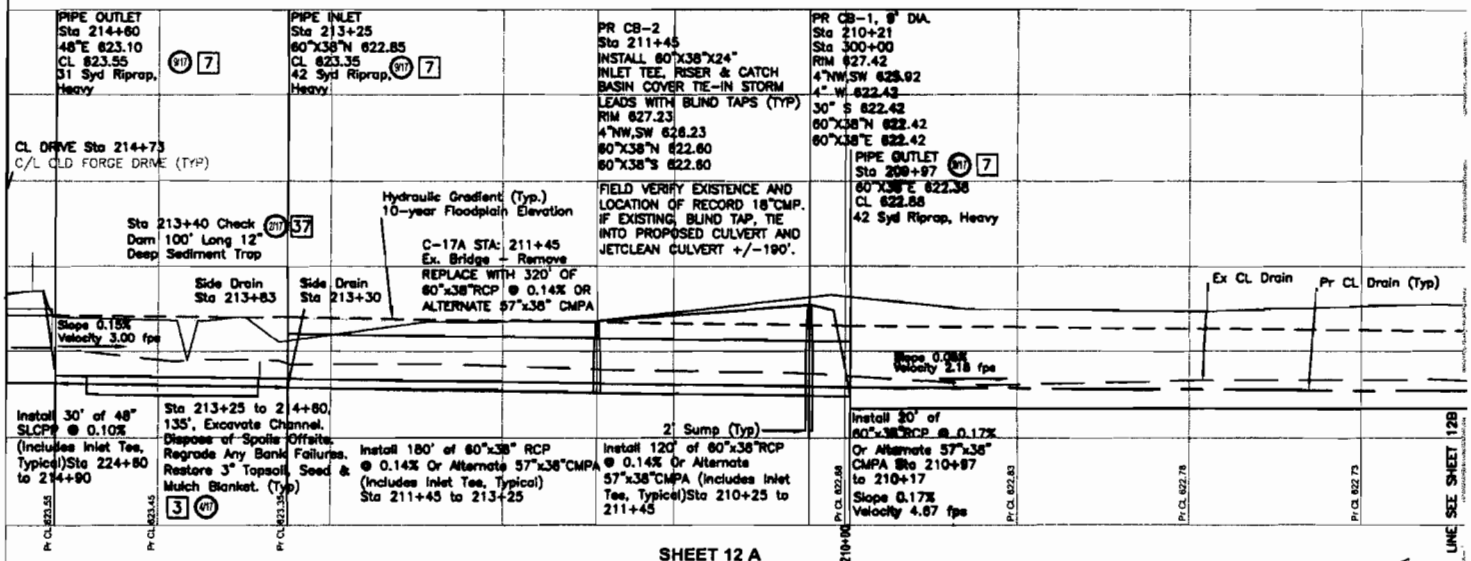


Cross Section Detail

Sta 202+45 to 209+97, 75'
Not To Scale



NOTE: ALL SMOOTH LINED CORRUGATED PLASTIC PIPE (SLCPP) AND FITTINGS ARE DESIGNED FOR ADVANCED DRAINAGE SYSTEMS (ADS). APPROVED EQUAL ALTERNATIVES INCLUDE OTHER HDPE PRODUCTS, A-2000, RCP AND OTHERS AS APPROVED BY SCCDC AND ENGINEER. ALL PLASTIC OR STEEL PIPE SHALL BE PERFORATED, IN GEOTEXTILE SOCK OR WRAPPED IN GEOTEXTILE FABRIC. FOR ALTERNATIVES, CONTRACTOR SHALL PROVIDE SHOP DRAWINGS AND SPECIFICATIONS FOR REVIEW AND APPROVAL.

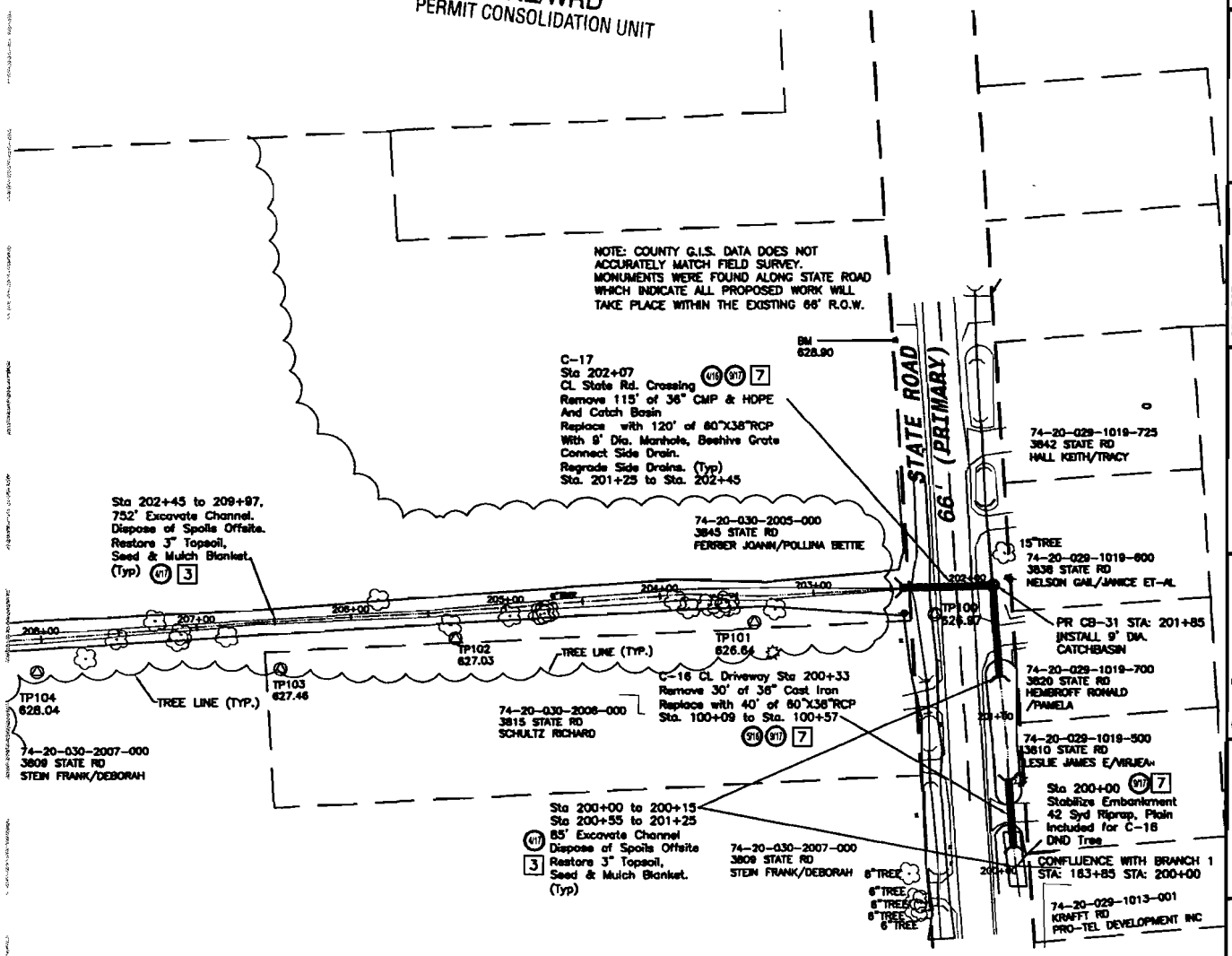


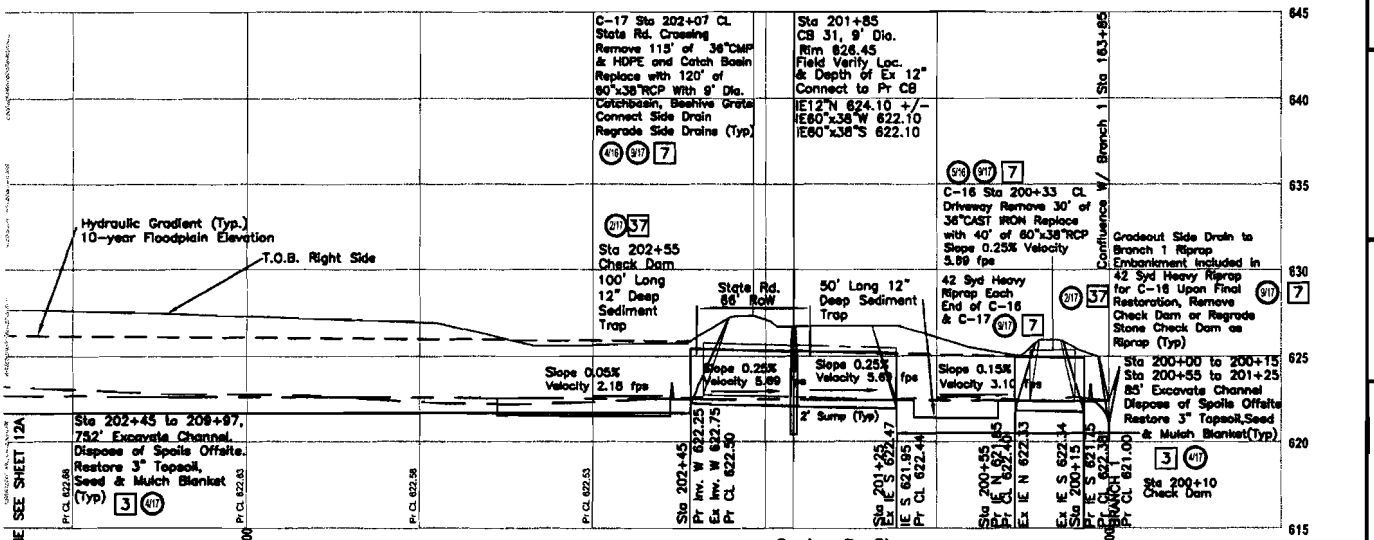
SHEET 12 A
PLAN & PROFILE
Branch 2

Revised

Benchmark List
BM Arrow on Hydrant
3845 State Road
Elevation - 628.90 feet

0 50 100
SCALE IN FEET





SHEET 12 B
PLAN & PROFILE
Branch 2

Scales: Profile
Horizontal Scale: 1" = 50'
Vertical Scale: 1" = 5'

901 Huron Ave, Suite 8
Port Huron, MI 48060
PHONE: 810-966-0640
FAX: 810-966-0691
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT: Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR: Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

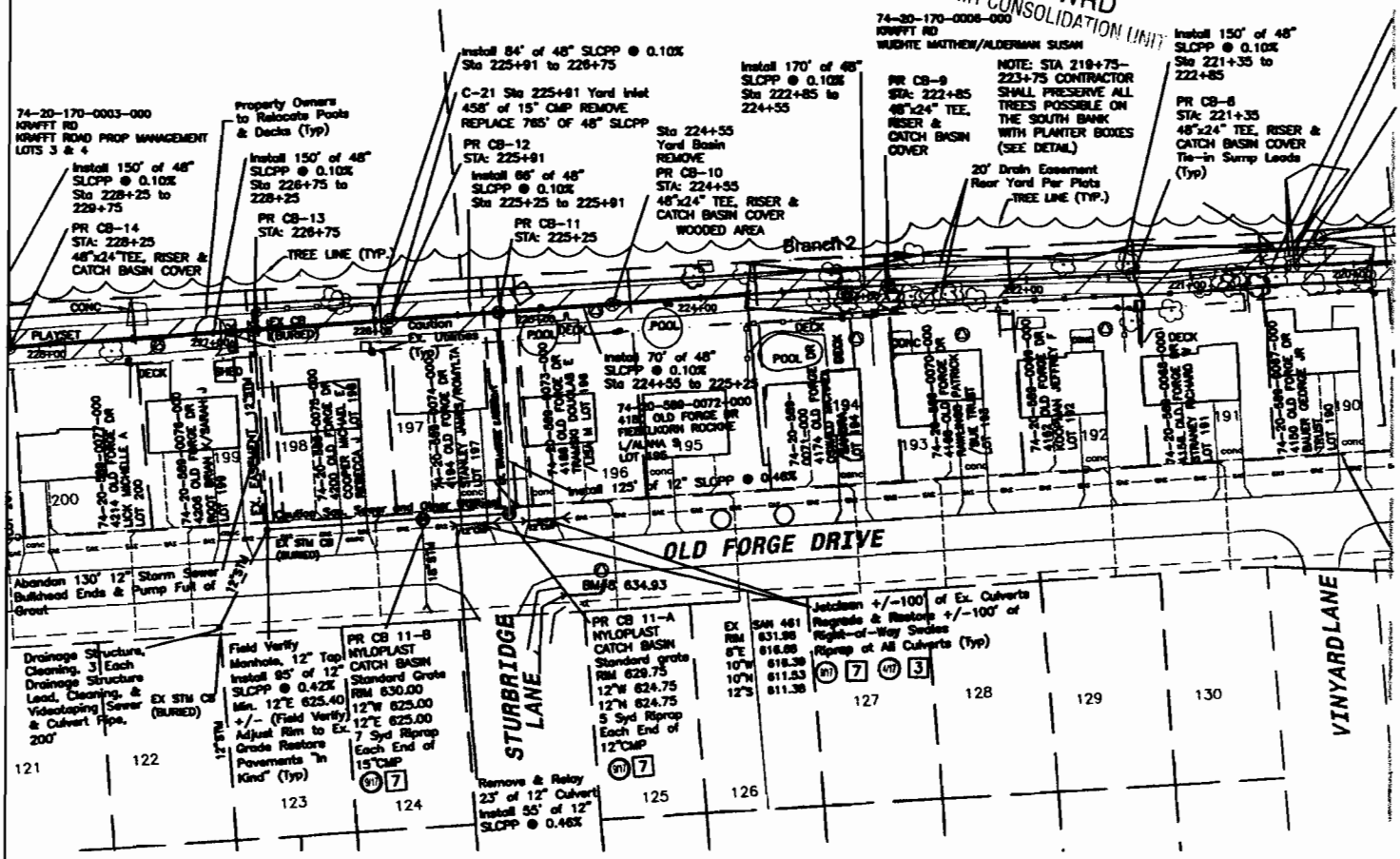
STATUS: ☐ PRELIMINARY ☐ FINAL ■ CONSTRUCTION

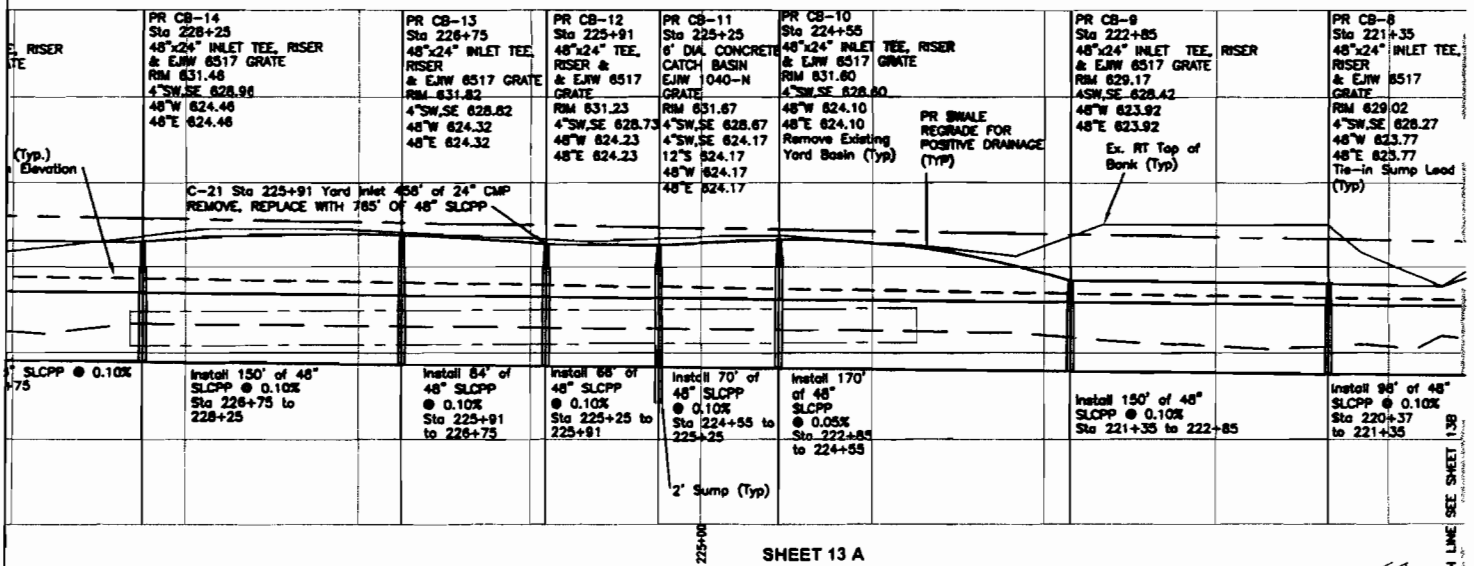
REVISION DATE: 1 2 3

PROJECT NO.: 04-1228
DATE: SEPTEMBER 10, 2010

SHEET 12B
PLAN & PROFILE
Branch 2
Sta: 200+00 to 214+60

Revised





SHEET 13 A
PLAN & PROFILE
Branch 2

RECEIVED

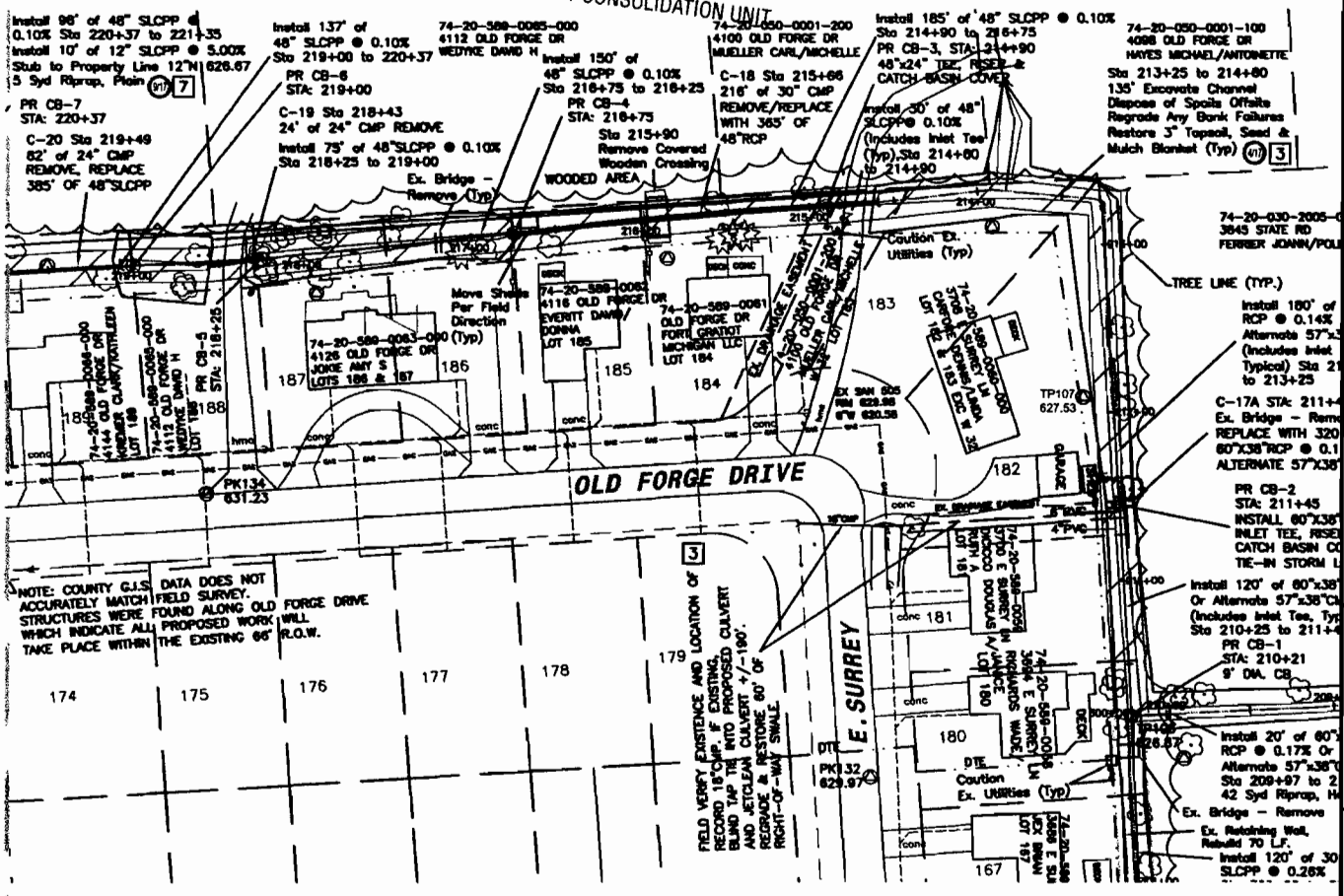
DEC 0 3 2010

DNRE/WRD
PERMIT CONSOLIDATION UNIT

Revised

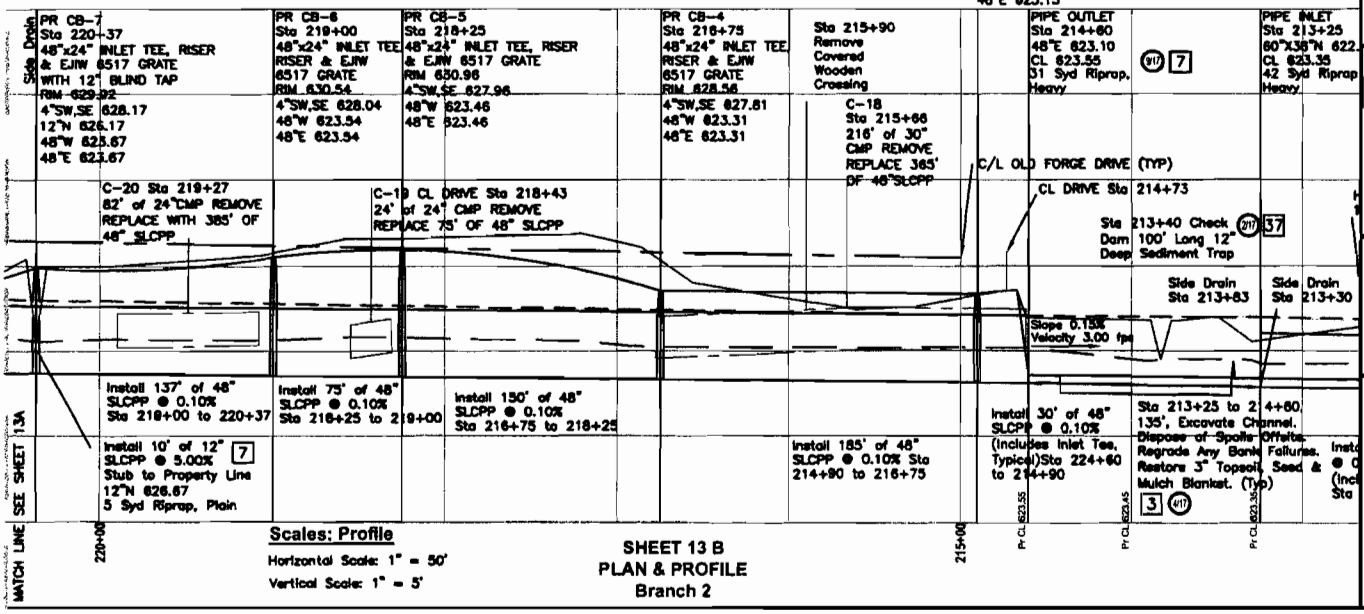
Benchmark List
BM-8 Arrow on Hydrant
3700 STURBRIDGE LANE
Elevation - 634.93 feet

0 50 100
SCALE IN FEET



NOTE: ALL SMOOTH LINED CORRUGATED PLASTIC PIPE (SLCPP) AND FITTINGS ARE DESIGNED FOR ADVANCED DRAINAGE SYSTEMS (ADS). APPROVED EQUAL ALTERNATIVES INCLUDE OTHER HDPE PRODUCTS, A-2000, RCP AND OTHERS AS APPROVED BY SCCDC AND ENGINEER. ALL PLASTIC OR STEEL PIPE SHALL BE PERFORATED, IN GEOTEXTILE SOCK OR WRAPPED IN GEOTEXTILE FABRIC. FOR ALTERNATIVES, CONTRACTOR SHALL PROVIDE SHOP DRAWINGS AND SPECIFICATIONS FOR REVIEW AND APPROVAL.

PR CB-3
Sta 214+90
48"x24" INLET TEE, RISER & EJIW 6517 GRATE
RIM 628.38
4"SW,SE 627.63
48"W 623.13
48"E 623.13



Scales: Profile
Horizontal Scale: 1" = 50'
Vertical Scale: 1" = 5'

SHEET 13 B
PLAN & PROFILE
Branch 2

901 Huron Ave, Suite B
Port Huron, MI 48060
PHONE: 810-966-0680
FAX: 810-966-0681
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT: Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR: Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS:
☐ PRELIMINARY
☐ FINAL
■ CONSTRUCTION

REVISION DATE:
1
2
3

DATE: SEPTEMBER 10, 2010

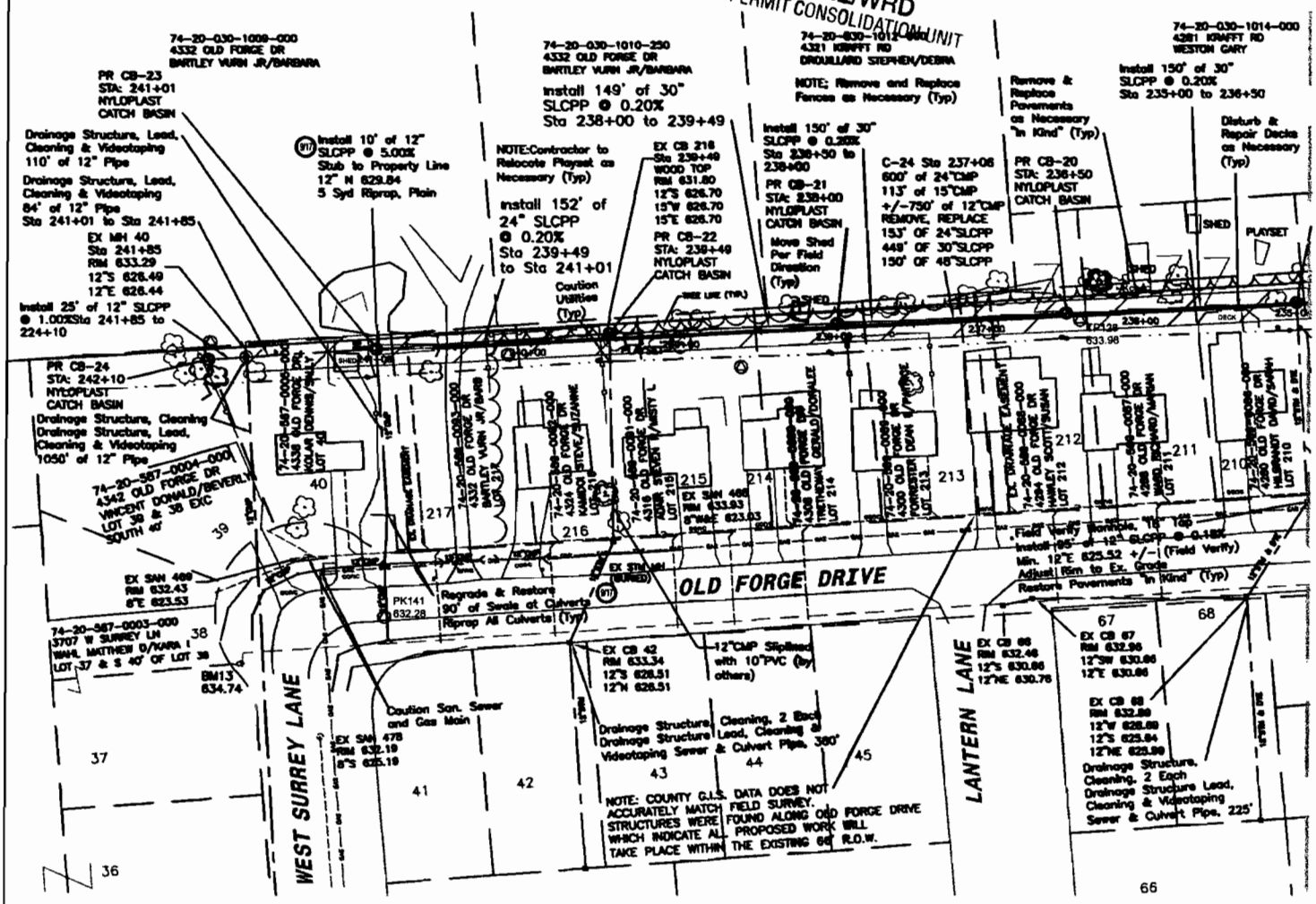
PROJECT NO.: 04-1228

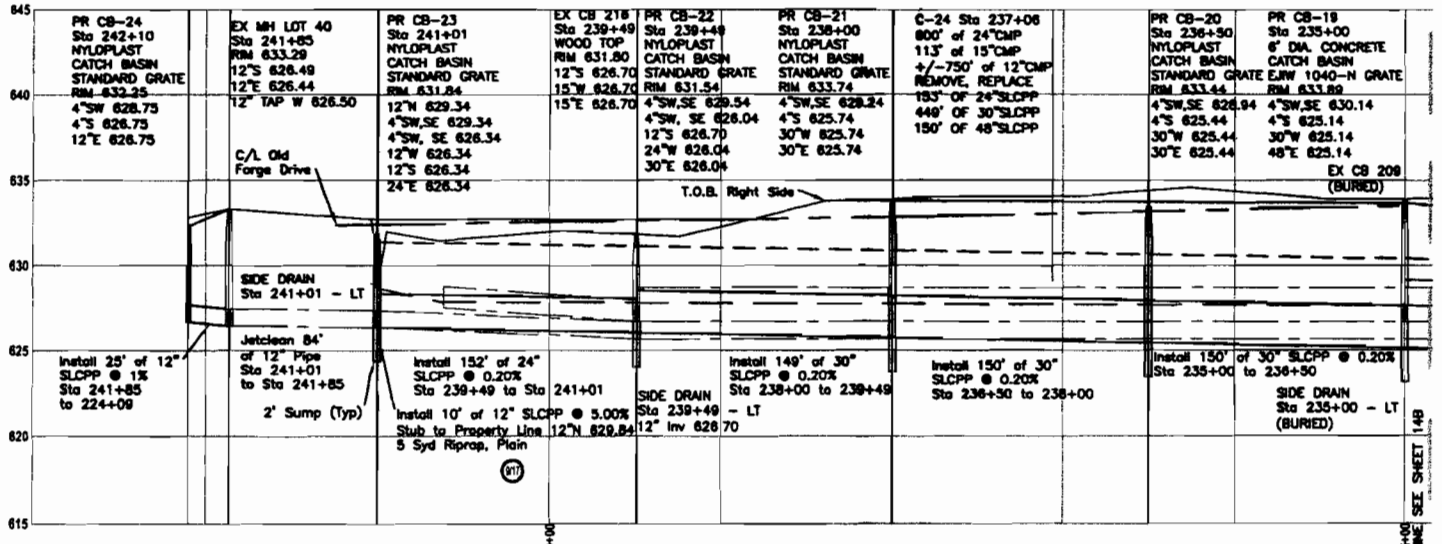
SHEET 13B
PLAN & PROFILE
Branch 2
Sta: 214+60 to 228+25

57 58

RECEIVED
DEC 0 3 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

Revised





SHEET 14 A
PLAN & PROFILE
Branch 2

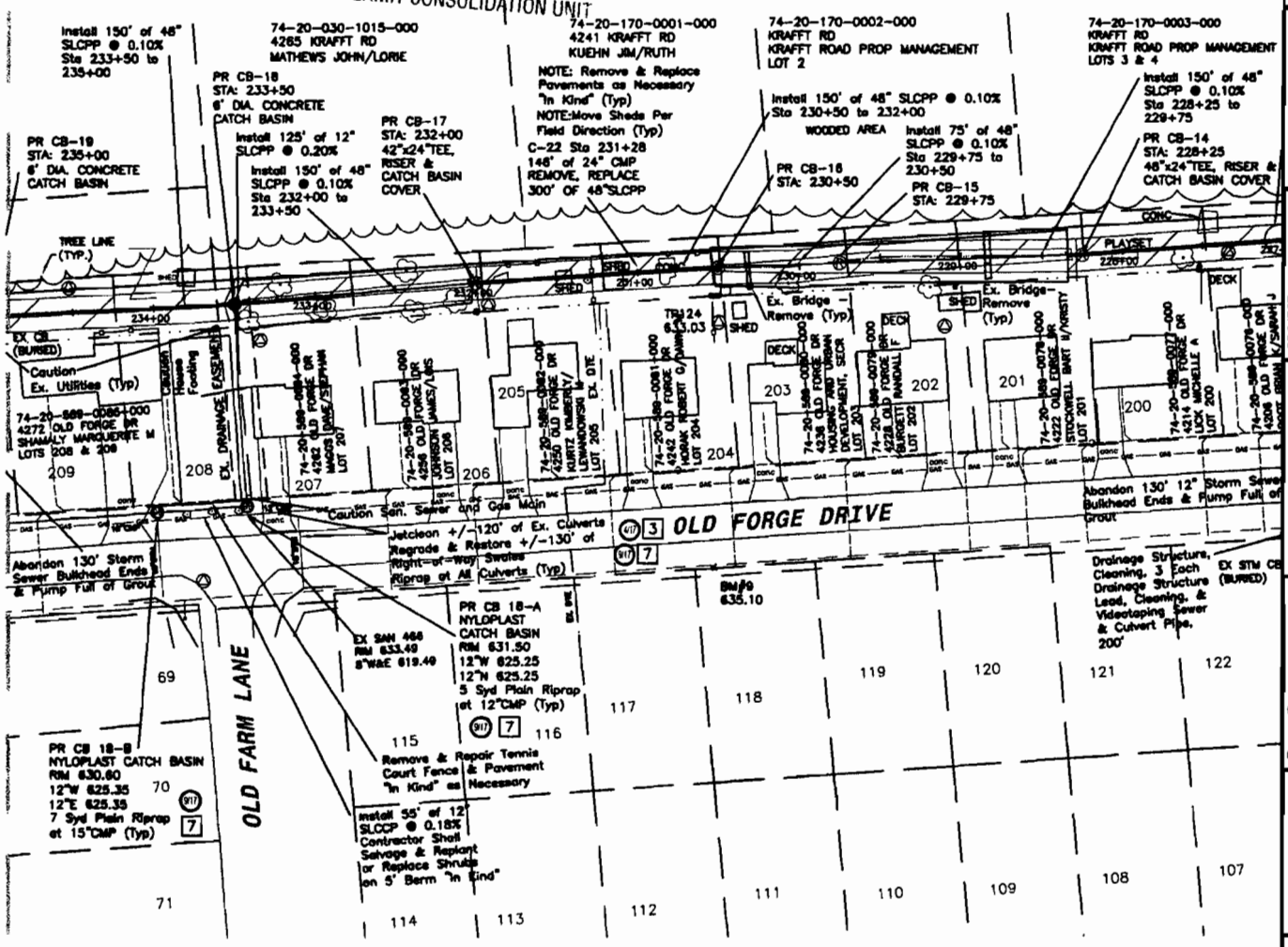
Revised

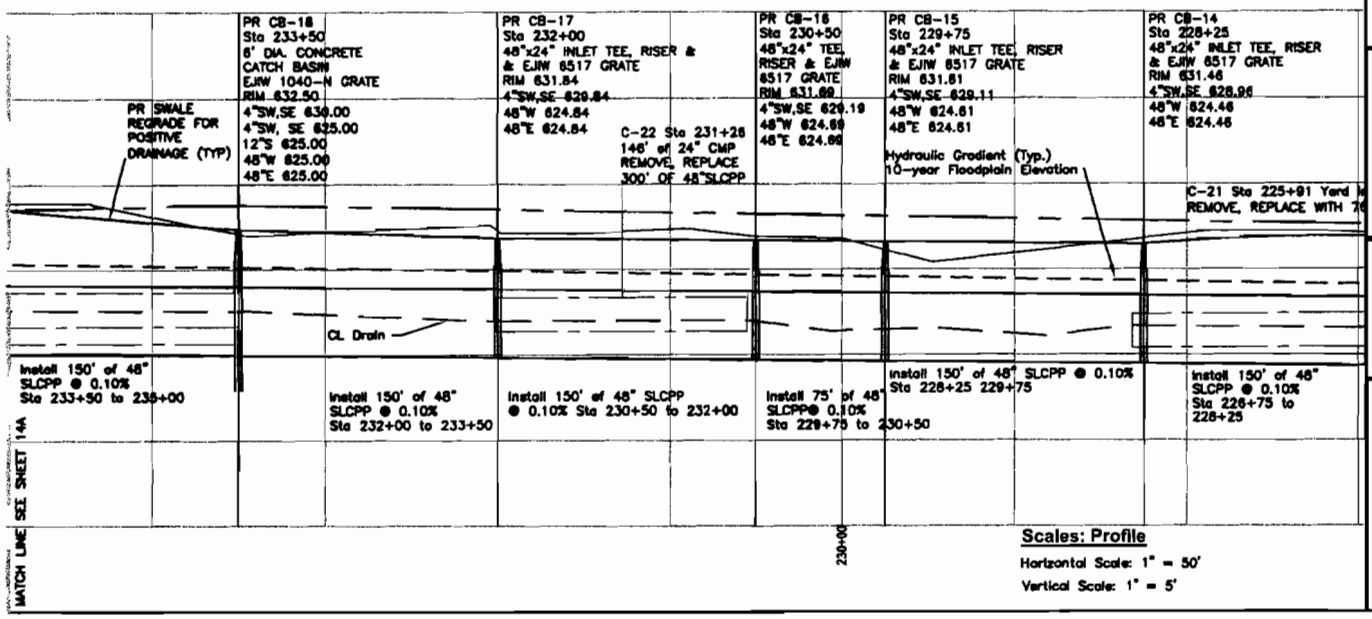
Benchmark List

BM-11 Arrow on Hydrant
4289 OLD FORGE DRIVE
Elevation - 635.01 feet

BM-13 Arrow on Hydrant
3707 WEST SURREY LANE
Elevation - 634.74 feet

0 50 100
SCALE IN FEET





Scales: Profile
Horizontal Scale: 1" = 50'
Vertical Scale: 1" = 5'

901 Huron Ave, Suite 8
Port Huron, MI 48060
PHONE: 810-966-0680
FAX: 810-966-0681
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT: Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR: Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS: ☐ PRELIMINARY ☐ FINAL ■ CONSTRUCTION

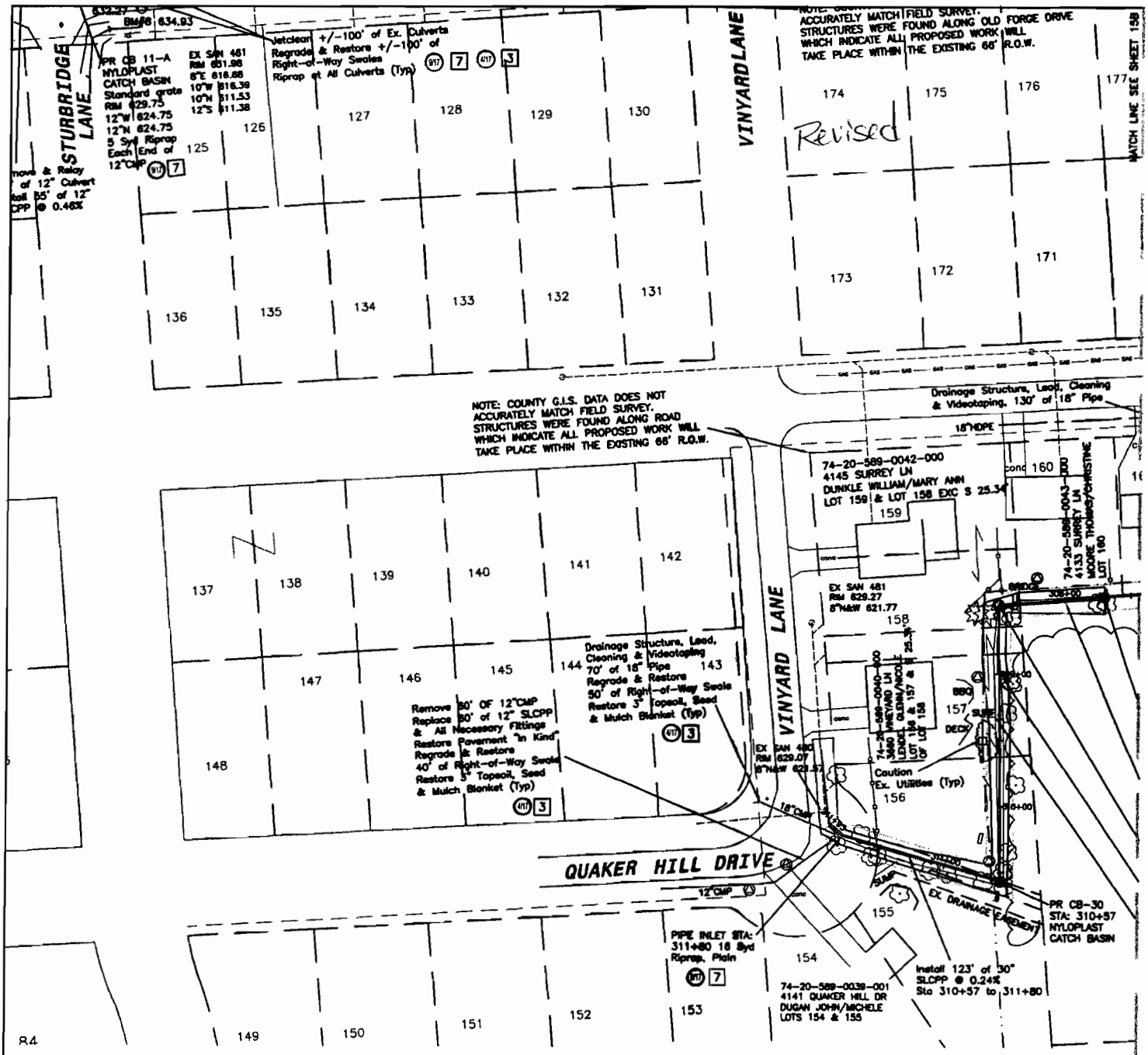
REVISION DATE: 1 2 3

DATE: SEPTEMBER 10, 2010

PROJECT NO.: 04-1228

SHEET 14 B
PLAN & PROFILE
Branch 2
Sta: 228+25 to 242+10

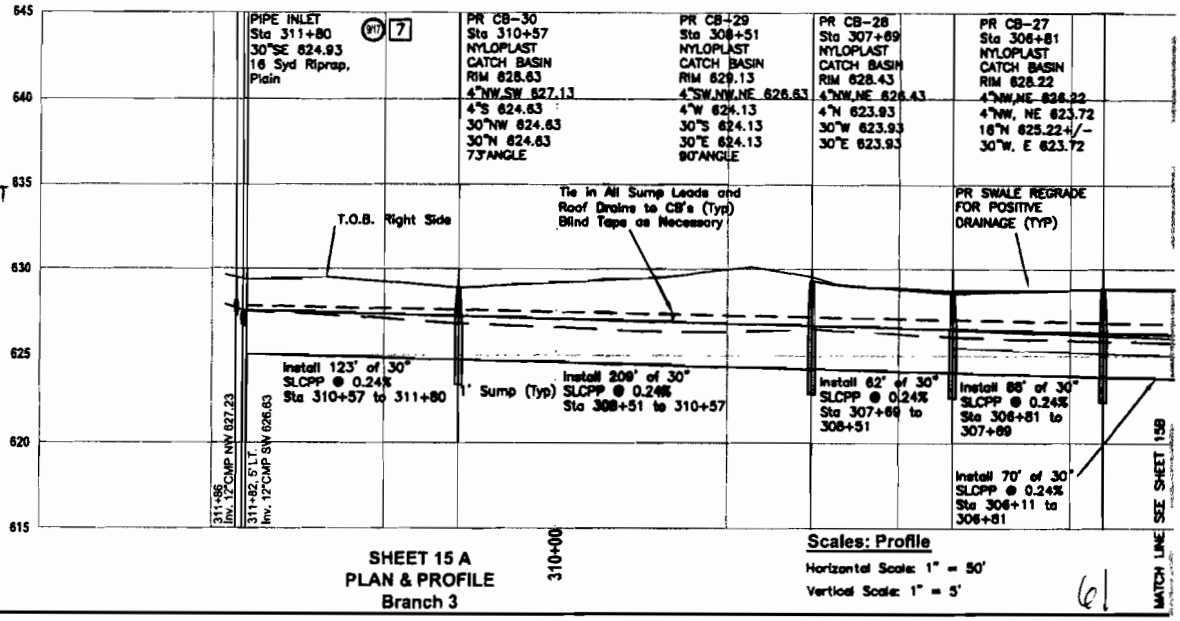
60



RECEIVED

DEC 0 3 2010

DNRE/WRD
PERMIT CONSOLIDATION UNIT



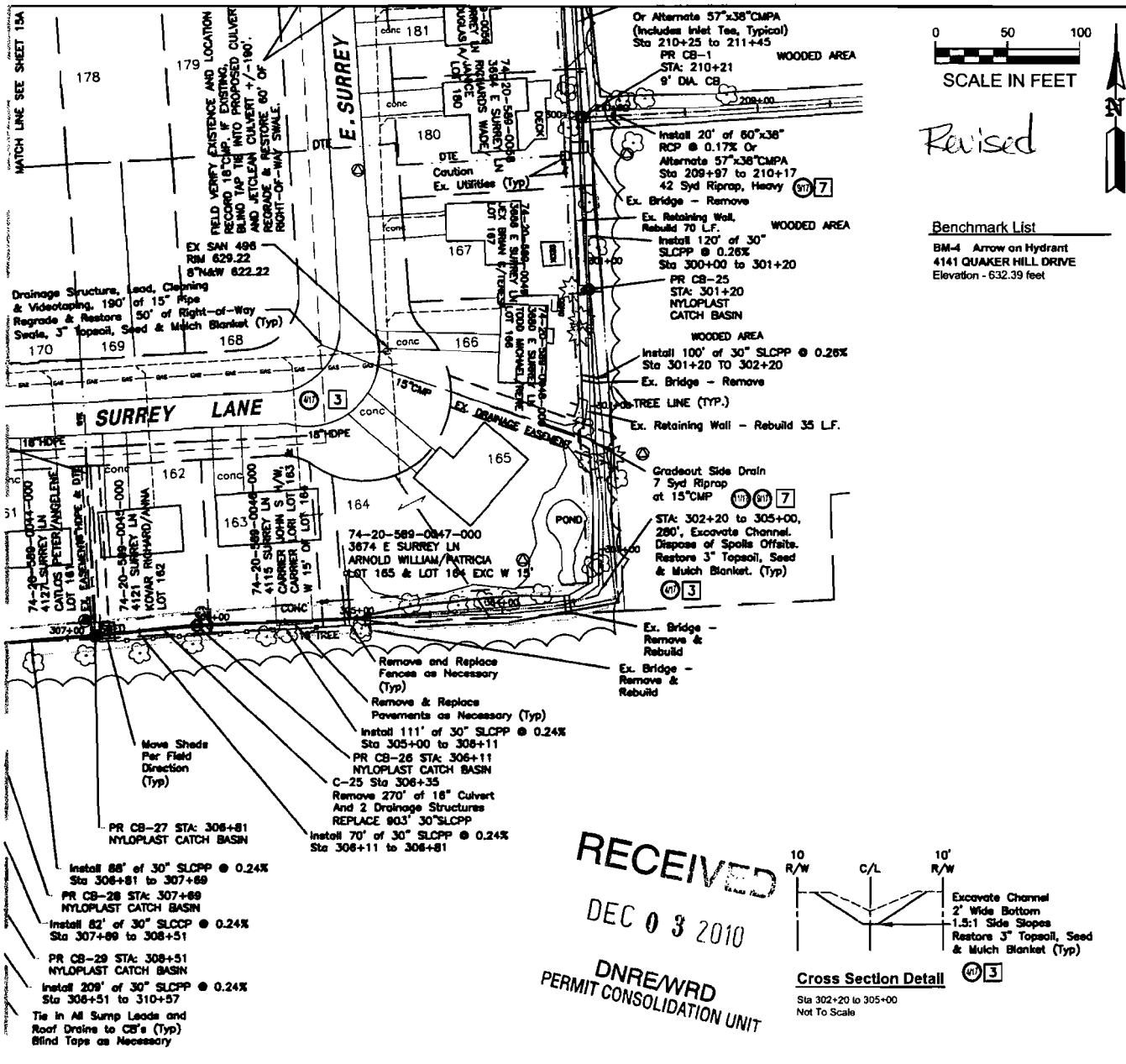
SHEET 15 A
PLAN & PROFILE
Branch 3

Scales: Profile

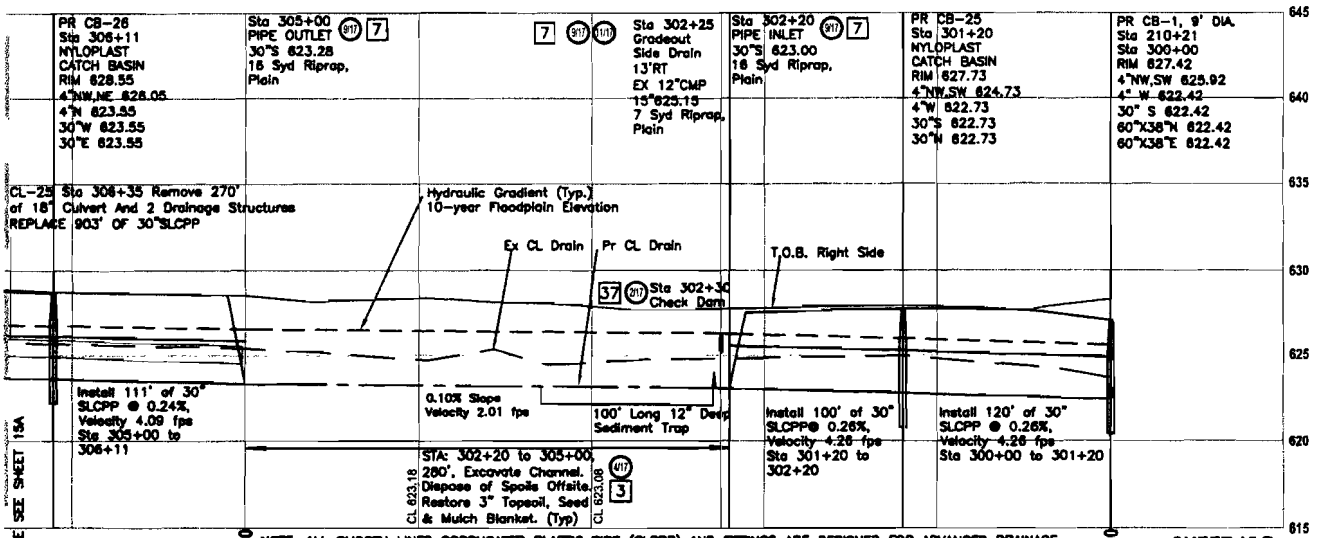
Horizontal Scale: 1" = 50'

Vertical Scale: 1" = 5'

6



RECEIVED
DEC 03 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT



NOTE: ALL SMOOTH LINED CORRUGATED PLASTIC PIPE (SLCPP) AND FITTINGS ARE DESIGNED FOR ADVANCED DRAINAGE SYSTEMS (ADS).APPROVED EQUAL ALTERNATIVES INCLUDE OTHER HDPE PRODUCTS, A-2000, RCP AND OTHERS AS APPROVED BY SCCDC AND ENGINEER. ALL PLASTIC OR STEEL PIPE SHALL BE PERFORATED, IN GEOTEXTILE SOCK OR WRAPPED IN GEOTEXTILE FABRIC. FOR ALTERNATIVES, CONTRACTOR SHALL PROVIDE SHOP DRAWINGS AND SPECIFICATIONS FOR REVIEW AND APPROVAL.

SHEET 15 B
PLAN & PROFILE
Branch 3

901 Huron Ave, Suite 6
Port Huron, MI 48060
PHONE: 810-966-0060
FAX: 810-966-0061
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT: **Gossman Drain**
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR:
Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS:
☐ PRELIMINARY
☐ FINAL
■ CONSTRUCTION

REVISION DATE:
1
2
3

DATE: SEPTEMBER 10, 2010

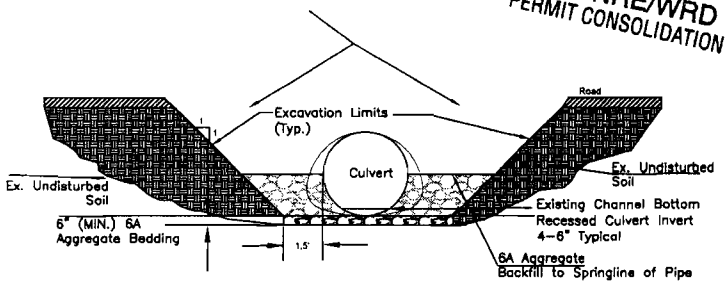
PROJECT NO.: 04-1228

SHEET 15B
PLAN & PROFILE
Branch 3
Sta: 300+00 to 311+93

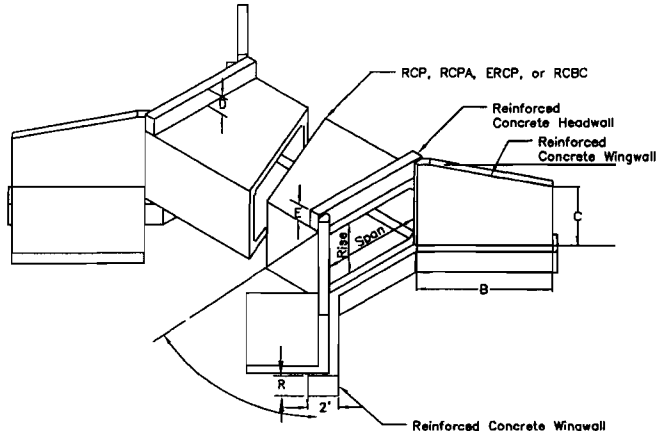
62

Revised

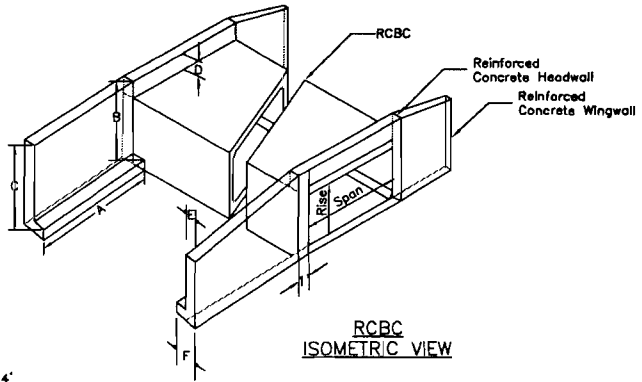
REMAINDER OF FILL PER ROAD CROSS SECTION DETAILS – THIS PAGE (SCCRC APPROVED CROSS SECTIONS)



1/16 CULVERT CROSS SECTION
NOT TO SCALE

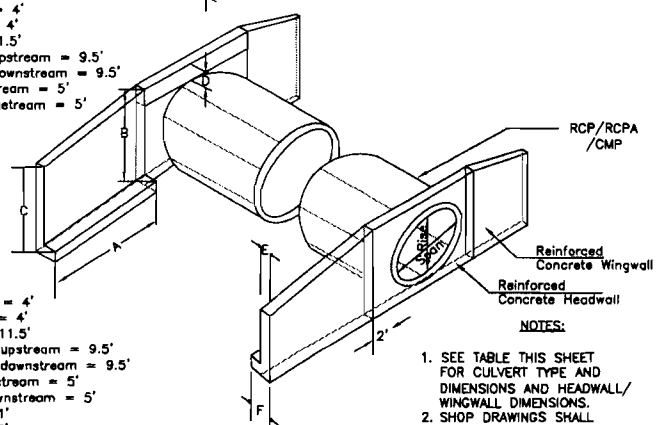


RCBC ISOMETRIC VIEW



RCBC ISOMETRIC VIEW

C–2
Span = 4'
Rise = 4'
A = 11.5'
B, C upstream = 9.5'
B, C downstream = 9.5'
O upstream = 5'
D downstream = 5'
E = 1'
F = 2'



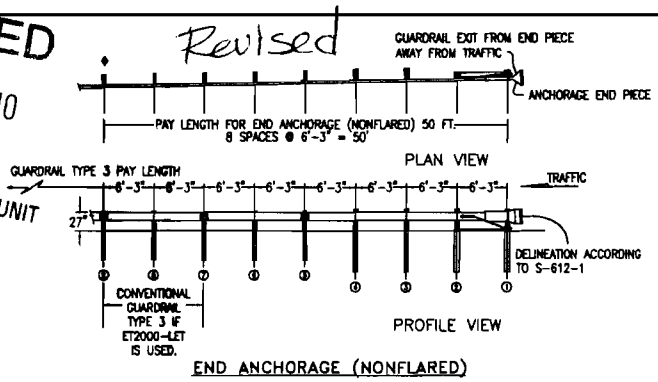
C–26
Span = 4'
Rise = 4'
A = 11.5'
B, C upstream = 9.5'
B, C downstream = 9.5'
D upstream = 5'
D downstream = 5'
E = 1'
F = 2'

PIPE ISOMETRIC VIEW

2/16 HEADWALL AND WINGWALL DETAILS
FOR PRE-CAST OR CAST-IN-PLACE CONCRETE ALTERNATIVE –NOT TO SCALE

NOTES:

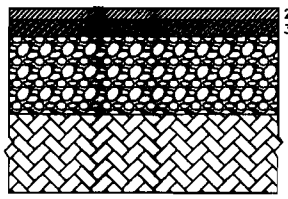
1. SEE TABLE THIS SHEET FOR CULVERT TYPE AND DIMENSIONS AND HEADWALL/ WINGWALL DIMENSIONS.
2. SHOP DRAWINGS SHALL BE PREPARED, SEALED AND SIGNED BY A STRUCTURAL PROFESSIONAL ENGINEER IN THE STATE OF MICHIGAN AND SUBMITTED TO SCCDC & HURON CONSULTANTS FOR REVIEW & APPROVAL PRIOR TO CONSTRUCTION.



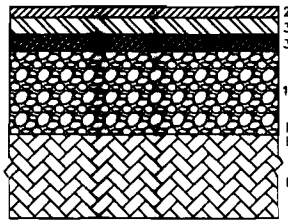
END ANCHORAGE (NONFLARED)

GUARD RAIL GENERAL NOTES

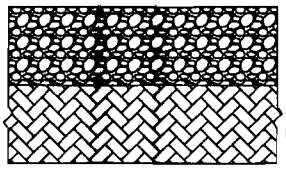
1. THE END ANCHORAGE (NONFLARED) SHALL BE THE ET2000–LET GUARDRAIL END ANCHORAGE (NONFLARED).AS MANUFACTURED BY THE SYRO STEEL COMPANY, CENTERVILLE, UTAH (TEL: 801–292–4461), OR THE SKT GUARDRAIL END ANCHORAGE (NONFLARED) AS MANUFACTURED BY UNIVERSAL INDUSTRIAL SALES, INC., OF PLEASANT GROVE, UTAH (TEL: 800–424–9825), OR AN APPROVED DESIGN OF EQUAL PROPERTIES. END ANCHORAGE (NONFLARED) SHALL INCLUDE ALL POST, RAIL, AND HARDWARE ITEMS REQUIRED FOR A COMPLETE UNIT. THE END ANCHORAGE (NONFLARED) SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PARTS LISTS TO THE ENGINEER PRIOR TO THE INSTALLATION OF THE DEVICE.
2. POSTS SHALL BE DRILLED FOR BREAKAWAY AS PER THE MANUFACTURER'S INSTRUCTIONS.
3. DO NOT USE REFLECTOR TABS ON THE LAST 7 POSTS OF THE END ANCHORAGE (NONFLARED).
4. USE MANUFACTURE'S RECOMMENDED STEEL FOUNDATION TUBE FOR POSTS NO.1, NO.2, NO.3, 4. AND NO.4 FOR ET2000–LET AND SKT END ANCHORAGES (NONFLARED).
5. TYPE 3 DELINEATOR SHALL BE PLACED ADJACENT TO THE END ANCHORAGE AS PER MDOT STANDARDS.



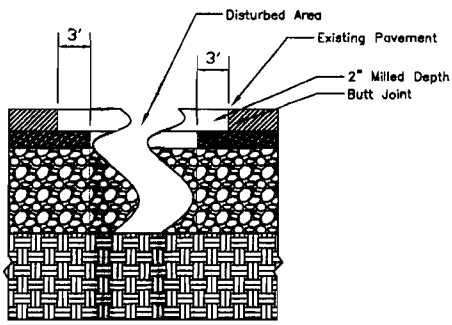
Local Road (Asphalt)
SCCRC Approved Cross Section



Primary Road and Class A Haul Roads
SCCRC Approved Cross Section



Local Road (Gravel)
SCCRC Approved Cross Section



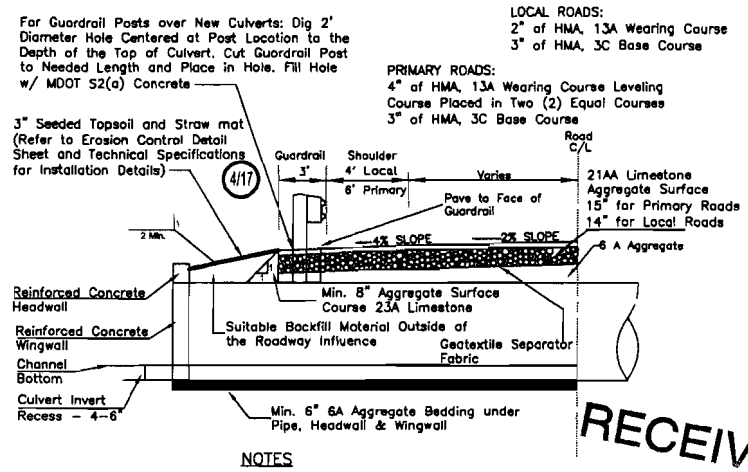
General Road Repaving Detail

MATCH LINE SEE SHEET 16B

MATCH LINE SEE SHEET 16B

SHEET 16A
CROSSING DETAILS

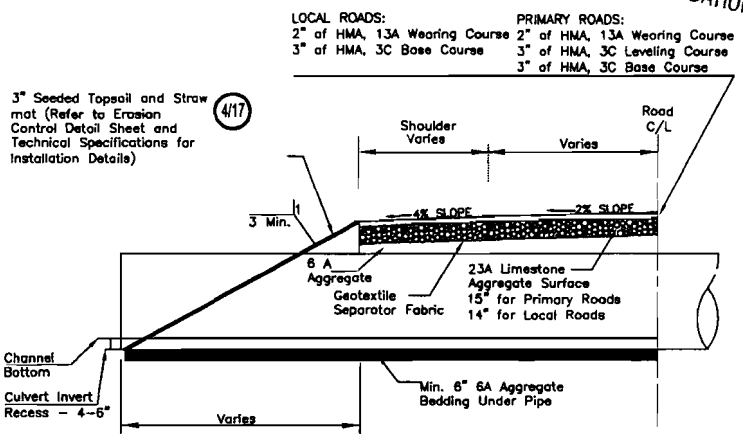
MATCH LINE SEE SHEET 16A



NOTES

1. MINIMUM 12" AGGREGATE 23A LIMESTONE IF GRAVEL ROAD

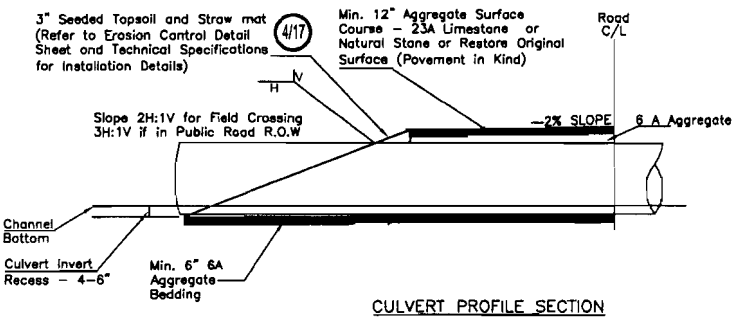
3/16 ROAD CROSSING WITH GUARDRAIL
NOT TO SCALE



NOTES

1. MINIMUM 12" AGGREGATE 23A LIMESTONE IF GRAVEL ROAD

4/16 ROAD CROSSING WITHOUT GUARDRAIL
NOT TO SCALE



CULVERT PROFILE SECTION

NOTES:

1. CULVERTS WILL BE PROVIDED BY CONTRACTOR
2. NEW CULVERT INVERT SHALL BE AT LEAST FOUR(3) INCHES BELOW THE EXISTING GRADE OF THE CHANNEL. STRICT ADHERENCE TO THE SPECIFIED INVERTS IS REQUIRED TO ENSURE PROPER CHANNEL FUNCTION.
3. CULVERT SLOPE SHALL BE SPECIFIED PER PLANS
4. FINISHED ROADWAY ELEVATION SHALL MATCH EXISTING GROUND SURFACE ELEVATION WHERE POSSIBLE.
5. ROADWAY WIDTH SHALL MATCH EXISTING CONDITIONS.
6. MATCH EXISTING ROAD SURFACE TYPE.

5/16 PRIVATE CROSSING DETAILS
NOT TO SCALE

MATCH LINE SEE SHEET 16A

GENERAL NOTES Revised

1. Slopes are not to be steeper than indicated on the plans.
2. Headwall & Wingwall details – Contractor shall provide shop drawings of the proposed structures sealed by a registered Professional Engineer in the State of Michigan for review and approval by SCCDC and SCCRC.
3. Side Drains – All side drain relocations shall have 3H:1V side slope adjacent to road and 2H:1V side slope away from road, with 2' bottom width. And all relocations shall match existing grade of side drain/pipe and Drain bottom.
4. Mail Box – Contractor shall relocate the mail boxes adjacent to guard rail, as necessary.
5. Fire Hydrant – Contractor shall inform the Fire Department of the guard rails adjacent to the fire hydrants.
6. Contractor shall inform the County Road Commissioner and Municipality two working days (not to include Saturdays, Sundays and Holidays) prior to the start of work.
7. All necessary permits shall be obtained by the Contractor before commencement of work.
8. The contractor shall call MISSDIG three working days before digging. Location of all utilities shown here are approximate and may not be comprehensive.

CONSTRUCTION NOTES:

1. ALL CULVERT REMOVALS WILL BE PERFORMED IN ACCORDANCE WITH THE M.D.O.T. INTERIM 2003 STANDARD SPECIFICATIONS FOR CONSTRUCTION, SECTION 203 (REMOVING DRAINAGE STRUCTURES, CULVERTS, AND SEWERS).
2. UNLESS OTHERWISE SPECIFIED, CULVERTS SHALL BE PLACED AND BACKFILLED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE HIGHWAY AGENCY HAVING JURISDICTION.
3. UNLESS OTHERWISE SPECIFIED, ALL MATERIALS USED IN CULVERT INSTALLATIONS WILL MEET MDOT INTERIM 2003 STANDARD SPECIFICATIONS FOR CONSTRUCTION.
4. UNLESS OTHERWISE SPECIFIED, CULVERT WALL THICKNESS REQUIREMENTS SHALL MEET MDOT CLASS "B" CRITERIA.
5. PRECAST CONCRETE BOX CULVERTS SHALL MEET THE SPECIFIED ASTM REQUIREMENTS FOR MS-18 (HS20) LOADING.
6. THE PAVEMENT DEPTH SHOWN IS A MINIMUM. IF THE EXISTING PAVEMENT IS GREATER THAN THE MINIMUM SHOWN, THE DEPTH OF PAVING SHALL BE EQUAL TO THE EXISTING PAVEMENT. BITUMINOUS PAVEMENT SHALL BE LAID IN A MINIMUM OF TWO (2) COURSES. THE LOWER COURSE(S) SHALL BE MDOT HMA, 3C. THE TOP COURSE SHALL BE MDOT HMA, 13A.
7. BITUMINOUS BINDER SHALL HAVE A MINIMUM GRADE OF PG 64-28.
8. FOR CONCRETE PAVING, ALL WORKMANSHIP AND MATERIAL SHALL BE CURRENT MDOT STANDARDS AND SPECIFICATIONS.
9. NEW OR REPLACED CULVERT INVERTS MAY BE AT ELEVATIONS BELOW THE BOTTOM GRADE OF THE CHANNEL. STRICT ADHERENCE TO THE SPECIFIED INVERTS IS REQUIRED TO ENSURE PROPER CHANNEL FUNCTION.

CULVERT CROSSINGS OF ROADWAYS (PUBLIC AND PRIVATE)

1. THE PAVEMENT SHALL BE REMOVED BY MILLING METHOD, PAVEMENT EDGES SHALL BE TRIMMED TO PROVIDE A CLEAN, VERTICAL SURFACE PRIOR TO PLACING NEW PAVEMENT.
2. ALL CONSTRUCTION SHALL BE STAGED TO PROVIDE FIRE/EMERGENCY ACCESS AT ALL TIMES.
3. FULL ROAD SHALL BE OPENED TO TWO-WAY TRAFFIC AT THE END OF THE WORK DAY. TEMPORARY HMA PAVEMENT SHALL BE PROVIDED AND MAINTAINED.
4. ALL BEDDING AND BACKFILL SHALL BE PLACED IN ACCORDANCE WITH THE MDOT 2003 STANDARD SPECIFICATIONS FOR CONSTRUCTION.
5. CONTACT THE ST. CLAIR COUNTY ROAD COMMISSION AND THE MUNICIPALITY TWO WORKING DAYS (NOT TO INCLUDE SATURDAYS, SUNDAYS, AND HOLIDAYS) PRIOR TO THE START OF CONSTRUCTION.
6. ONE LANE OF TRAFFIC CONTROL MUST BE MAINTAINED AT ALL TIMES DURING CULVERT INSTALLATIONS ON PUBLIC ROADS USING FLAG CONTROL.
7. ALL MATERIALS SHALL BE PROVIDED BY CONTRACTOR.
8. CMPA = POLYCOATED CORRUGATED METAL PIPE. ALL CMP PIPE AND JOINTS SHALL HAVE A POLYMERIC COATING APPLIED TO ALL SURFACES ACCORDING TO THE SPECIFICATIONS.
9. SHOP DRAWINGS FOR ALL BOX CULVERTS AND HEADWALLS SHALL BE PROVIDED BY THE CONTRACTOR, DESIGNED, SEALED AND SIGNED BY A STATE OF MICHIGAN REGISTERED STRUCTURAL ENGINEER, FOR APPROVAL BY SCCDC AND THEIR ENGINEER.

"All applicable construction shall comply with St. Clair County Road Commission standards and specifications. Approval of the plans by the St. Clair County Road Commission does not relieve the owner/developer of this requirement nor does it give approval to any errors and/or omissions contained in the plans."

IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ROAD COMMISSION, 1 WORK DAY IN ADVANCE, OF ANY NECESSARY SIGN REMOVAL WITHIN THE PROJECT LIMITS. IF THE CONTRACTOR FAILS TO NOTIFY THE ROAD COMMISSION, THEN THE CONTRACTOR ASSUMES LIABILITY OF ANY AND ALL SIGNS DAMAGED WITHIN THE PROJECT LIMITS AND WILL BE CHARGED FOR THE REPLACEMENT OF SAID SIGNS.

THE PLACEMENT OF PERMANENT TRAFFIC CONTROL SIGNS SHALL BE DONE IN ACCORDANCE WHAT THE "MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, 2005 EDITION AS AMENDED. THIS WORK WILL BE DONE BY THE ST. CLAIR COUNTY ROAD COMMISSION PRIOR TO THE FINAL ACCEPTANCE OF THE PROJECT.

DETOUR & TRAFFIC CONTROL NOTES

All traffic control devices used shall meet the requirements of the American Traffic Safety Association (ATSA) "Quality Standards for Work Zone Traffic Control Devices-1992." Traffic control devices are inclusive of signs, barricades, vertical panels, drums, warning lights, arrow boards, changeable message signs, cones, tubular markers, pavement tape and paint and pavement. All construction signage shall conform to 2005 MMUTCD, section 6, Construction Zones.

801 Huron Ave, Suite B
Port Huron, MI 48060
PHONE: 810-966-0600
FAX: 810-966-0681
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclaircounty.org

PROJECT: Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR: Bob Wiley
ST. CLAIR COUNTY
DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS: ☐ PRELIMINARY ☐ FINAL ■ CONSTRUCTION

REVISION DATE: 1 November 9, 2010 2 3

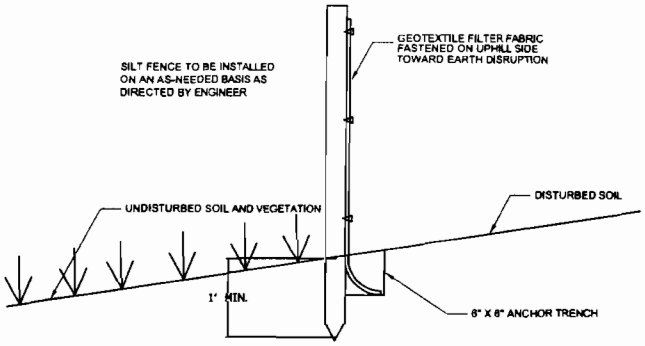
DATE: SEPTEMBER 10, 2010

PROJECT NO.: 04-1228

SHEET 16B
CROSSING DETAILS

16A

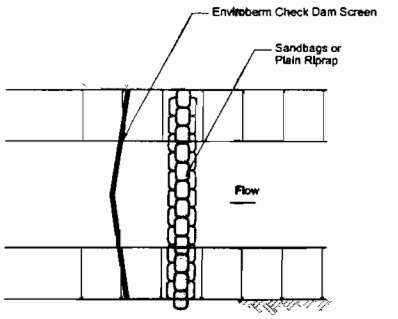
Revised



1/17 SILT FENCE DETAIL
NOT TO SCALE

SESC KEY

26	SILT FENCE	USES GEOTEXTILE FABRIC AND POSTS OR POLES. EASY TO CONSTRUCT AND LOCATE AS NECESSARY.



NOTES:
1. SANDBAGS SHALL BE 2 LAYERS HIGH, AND BE KEPT FLAT ACROSS THE BOTTOM OF CHANNEL TO AVOID CONCENTRATED FLOWS OVER LOW SPOTS.
2. SANDBAGS/RIPRAP SHALL BE PLACED UP THE BANK AT LEAST 1 FOOT ABOVE CENTER.
3. CARE SHOULD BE TAKEN TO AVOID CREATION OF SCOUR HOLES.
4. ENVIROBERM SHALL BE STAKED TO CONFORM TO CHANNEL BOTTOM.

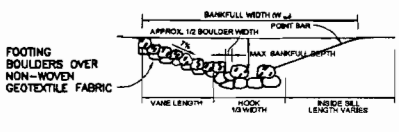
2/17 CHECK DAM DETAILS
NOT TO SCALE

SESC KEY

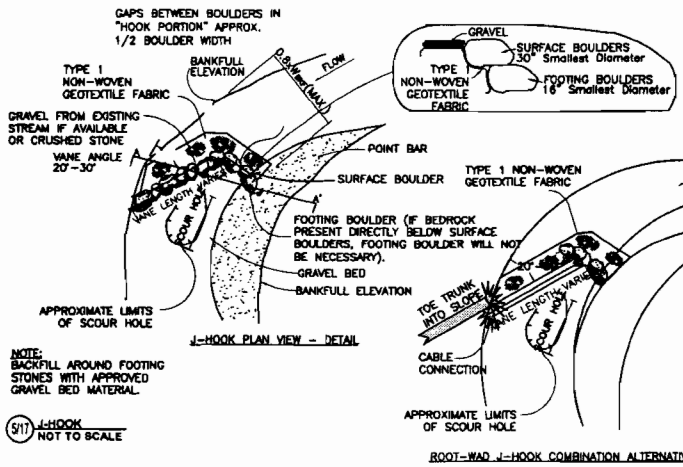
37		REDUCES FLOW VELOCITY CAUSES SEDIMENT TO BE CONSTRUCTED OF SAND BAGS

RECEIVED
DEC 0 3 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

MATCH LINE SEE SHEET 17B



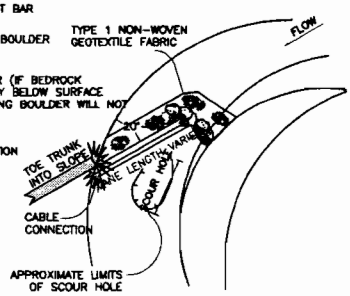
J-HOOK SECTION A-A'



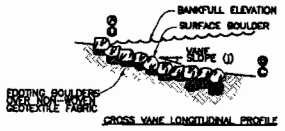
J-HOOK PLAN VIEW - DETAIL

NOTE:
BACKFILL AROUND FOOTING STONES WITH APPROVED GRAVEL BED MATERIAL.

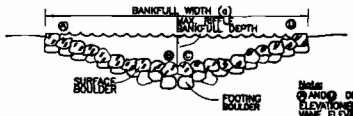
5/17 J-HOOK
NOT TO SCALE



ROOT-WAD J-HOOK COMBINATION ALTERNATIVE

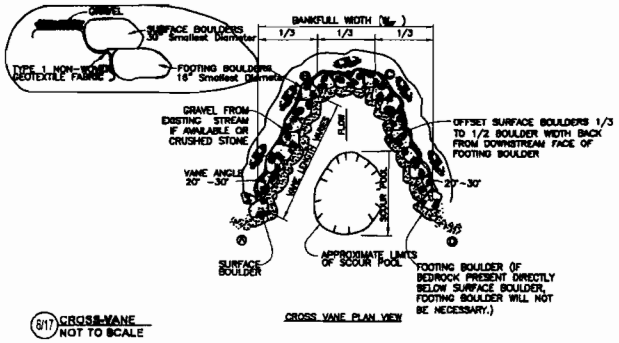


CROSS VANE LONGITUDINAL PROFILE



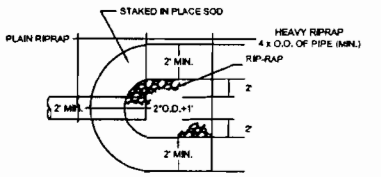
Notes ① AND ② DENOTE BANKFULL ELEVATIONS AND MARK VANE ELEVATION AT HEAD OF VANE.

CROSS VANE TYPICAL CROSS SECTION



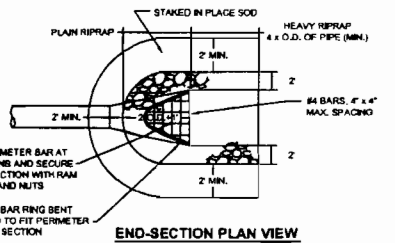
CROSS VANE PLAN VIEW

8/17 CROSS-VANE
NOT TO SCALE



PLAN VIEW

NOTE:
MINIMUM REQUIREMENTS FOR RIP-RAP MATERIAL SHALL MEET MDOT SPECIFICATION 813.03 UNLESS OTHERWISE SPECIFIED

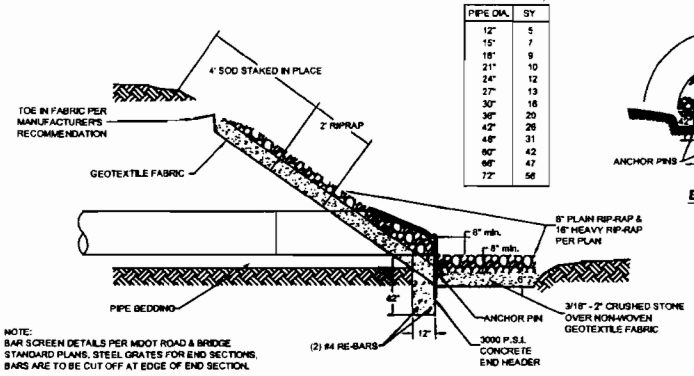


END-SECTION PLAN VIEW

NOTE:
MINIMUM REQUIREMENTS FOR RIP-RAP MATERIAL SHALL MEET MDOT SPECIFICATION 813.03 UNLESS OTHERWISE SPECIFIED

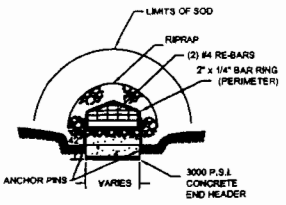
RIP RAP SCHEDULE
(x2 FOR FLARED END-SECTIONS)

PIPE DIA.	SY
12"	5
15"	7
18"	9
21"	10
24"	12
27"	13
30"	16
36"	20
42"	26
48"	31
60"	42
66"	47
72"	56



NOTE:
BAR SCREEN DETAILS PER MDOT ROAD & BRIDGE STANDARD PLANS. STEEL GRATES FOR END SECTIONS. BARS ARE TO BE CUT OFF AT EDGE OF END SECTION.

PROFILE VIEW



END VIEW

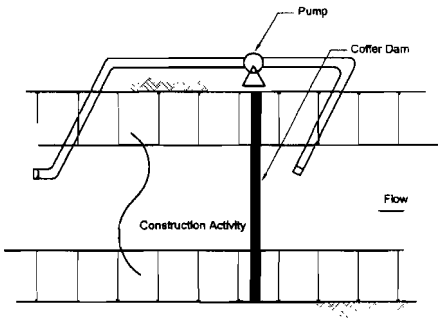
OUTLET RIP-RAP DETAIL
(9/17) (END SECTION AND BAR SCREEN AS APPLICABLE)

NOT TO SCALE
TYPICAL FOR ALL CULVERTS UNLESS OTHERWISE SPECIFIED

SHEET 17A
GENERAL DETAILS

MATCH LINE SEE SHEET 17B

MATCH LINE SEE SHEET 17A

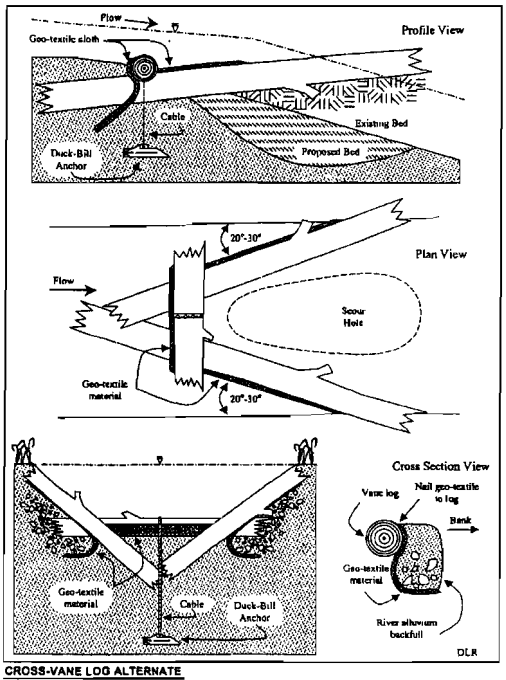


NOTES:
1. COFFER DAM SHALL BE MADE OF STEEL PLATES, SANDBAGS, OR OTHER MATERIALS APPROVED BY THE ENGINEER.
2. A PUMP SHALL BE UTILIZED TO ISOLATE CONSTRUCTION AREA FROM UPSTREAM AND DOWNSTREAM AREAS.
3. MINIMUM PUMPING CAPACITY SHALL BE 150 GPM.
4. COFFER DAMS SHALL BE REMOVED AT THE END OF EACH WORK DAY UNLESS OTHERWISE APPROVED BY THE ENGINEER.

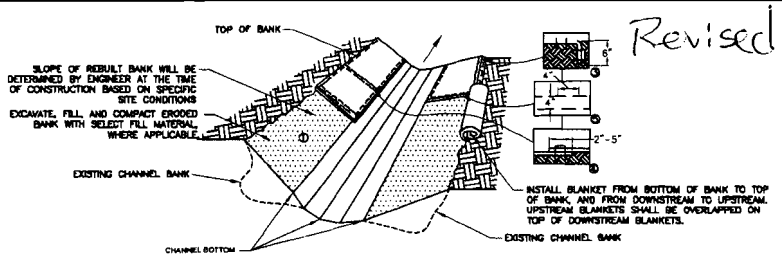
9/17 COFFER DAM DETAILS NOT TO SCALE

SESC KEY
34

WORK CAN BE CONTINUED DURING MOST ANTICIPATED STREAM CONDITIONS. CLEAR WATER CAN BE PUMPED DIRECTLY BACK INTO STREAM



CROSS-VANE LOG ALTERNATE
NOT TO SCALE



Revised

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.

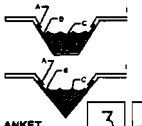
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE BLANKET IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30cm) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30cm) APART ACROSS THE WIDTH OF THE BLANKET.

3. FULL LENGTH EDGE OF BLANKETS AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

4. ADJACENT BLANKETS MUST BE OVERLAPPED APPROXIMATELY 2"-5" (5cm-12.5cm) (DEPENDING ON BLANKET TYPE) AND STAPLED. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE BLANKET BEING OVERLAPPED.

5. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT (9m-12m) INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10cm) APART AND 4" (10cm) ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.

6. THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.



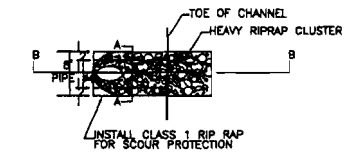
CRITICAL POINTS
A. OVERLAPS AND SEAMS
B. PROJECTED WATER LINE
C. CHANNEL BOTTOM/SIDE SLOPE VERTICES

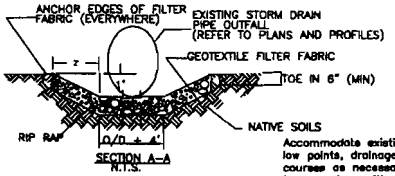
NOTE: * HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.
** IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 cm) MAY BE NECESSARY TO PROPERLY ANCHOR THE BLANKETS.

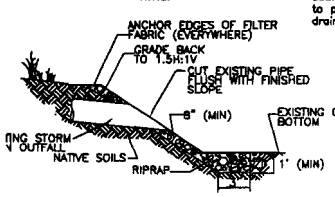
4/17 EROSION BLANKET NOT TO SCALE

3 SEEDING WITH MULCH AND/OR MATTING

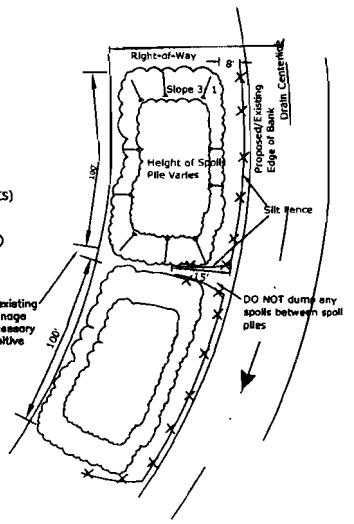
FACILITATES ESTABLISHMENT OF VEGETATIVE COVER EFFECTIVE FOR DRAINAGEWAYS WITH LOW VELOCITY EASILY PLACED IN SMALL QUANTITIES BY INEXPERIENCED PERSONNEL SHOULD INCLUDE PREPARED TOPSOIL BED





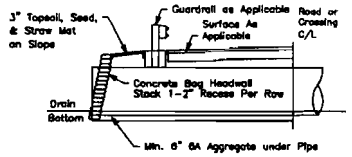


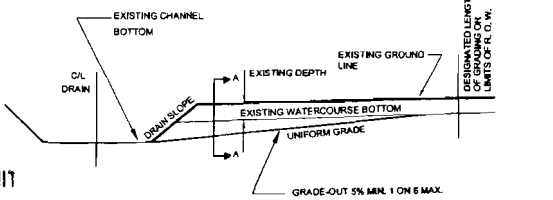
7/17 TYPICAL STORM DRAIN SPILLWAY DETAIL NOT TO SCALE



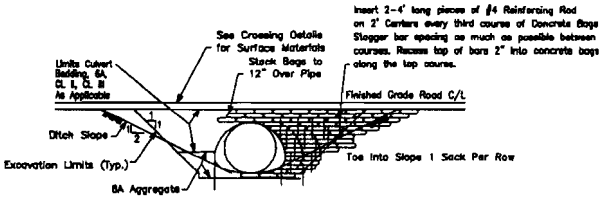
8/17 TYPICAL SPOIL DISPOSAL METHOD NOT TO SCALE

RECEIVED
DEC 0 3 2010
DNRE/WRD
PERMIT CONSOLIDATION UNIT

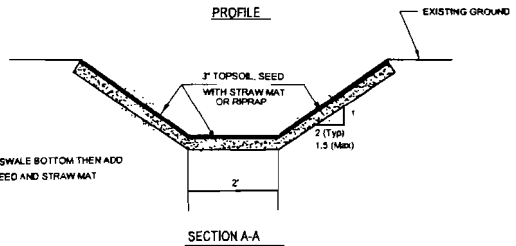




PROFILE



10/17 TYPICAL CONCRETE BAG HEADWALL DETAIL NOT TO SCALE



NOTE:
1. EXCAVATE SWALE BOTTOM THEN ADD TOPSOIL, SEED AND STRAW MAT

SECTION A-A

11/17 TYPICAL SIDE DRAIN GRADEOUT DETAIL NOT TO SCALE

MATCH LINE SEE SHEET 17A

901 Huron Ave, Suite 8
Port Huron, MI 48060
PHONE: 810-988-0880
FAX: 810-988-0081
www.huronconsultants.com
HURON CONSULTANTS

Aerial Photographs and Survey Data Provided by: www.stclarcounty.org

PROJECT: Gossman Drain
Fort Gratiot Township
ST. CLAIR COUNTY, MI

PREPARED FOR: Bob Wiley
ST. CLAIR COUNTY DRAIN COMMISSIONER

Drawn By: TDP
Checked By: EJO, PE
Approved By: EJO, PE

STATUS: ☐ PRELIMINARY ☐ FINAL ■ CONSTRUCTION

REVISION DATE: 1 November 9, 2010 | 2 | 3

DATE: SEPTEMBER 10, 2010

PROJECT NO.: 04-1228

SHEET 17B
GENERAL DETAILS

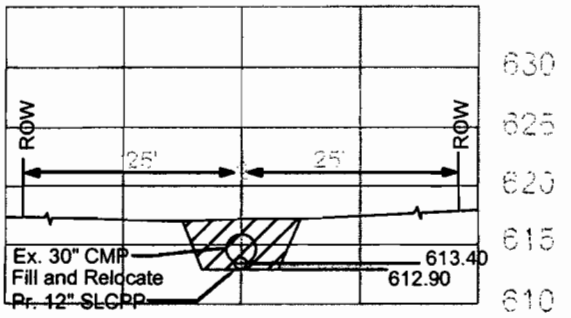
66

Supplemental: Cross Sections

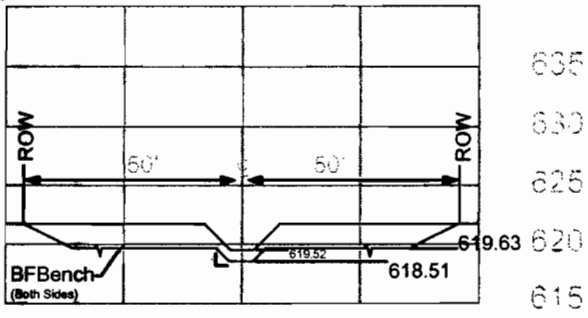
DEC 0 5 2010

DNRE/WRD
PERMIT CONSOLIDATION UNIT

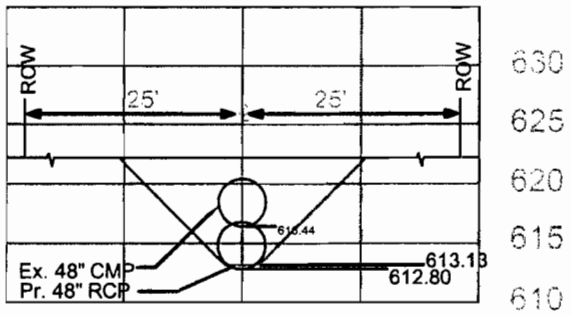
File No. ~~09-74-0061-P~~ Revised



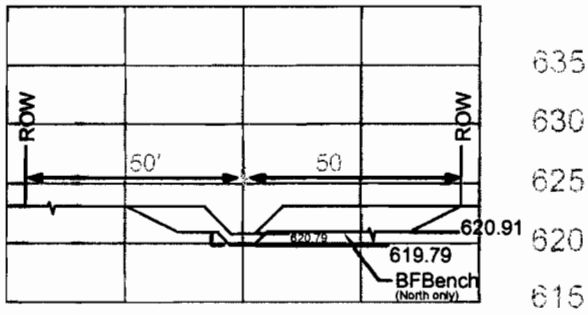
Br1 124+61



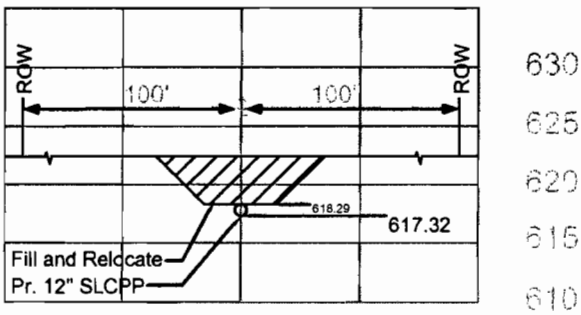
Br1 144+89



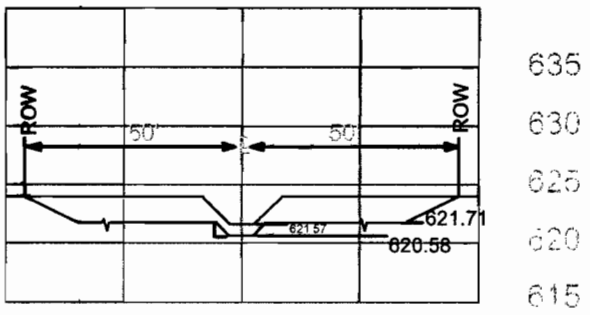
Br1 127+96



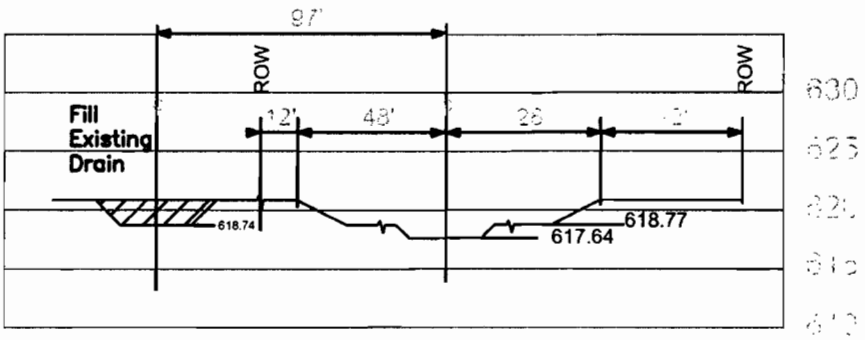
Br1 153+00



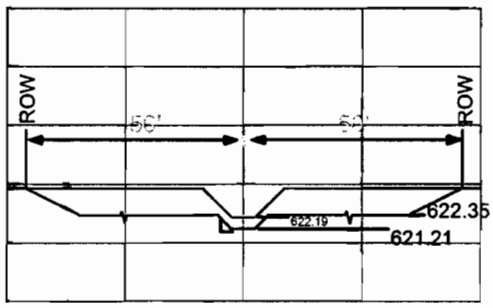
Br1 134+89



Br1 158+00



Br1 139+89
Prop. Br1 8+60

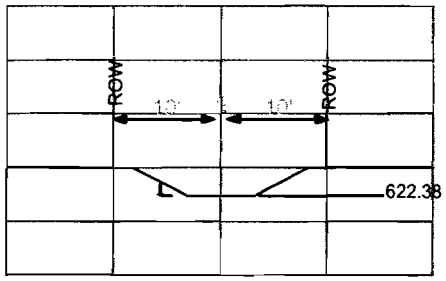


Br1 162+00

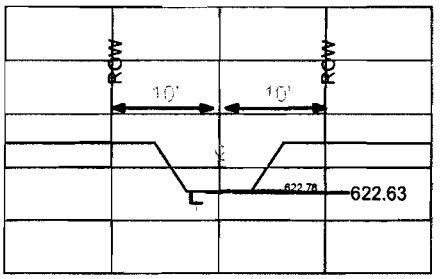
Existing Conditions
Proposed Conditions

Supplemental: Cross Sections

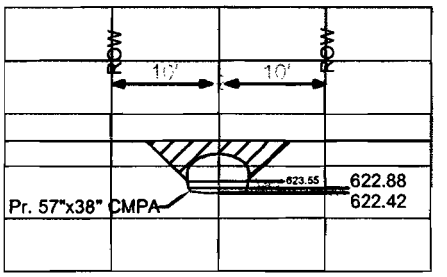
File No: ~~09-74-0067-P.~~ Revised



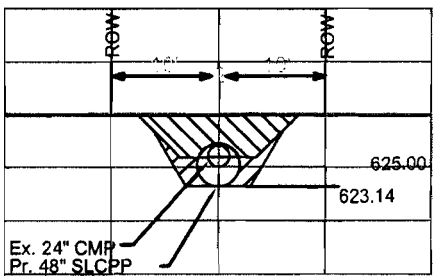
Br2 200+00



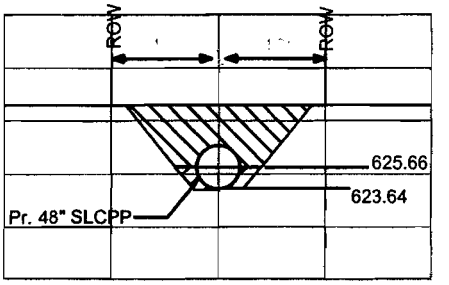
Br2 205+00



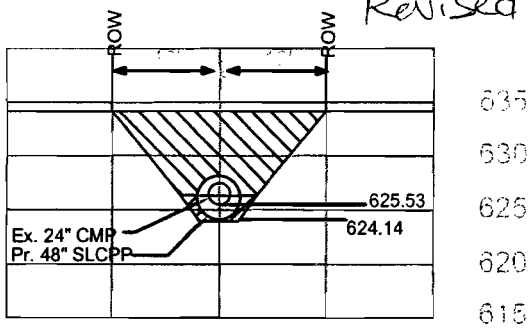
Br2 210+00



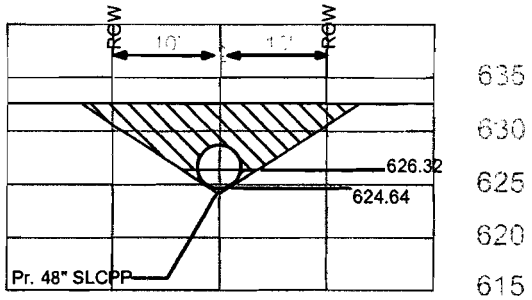
Br2 215+00



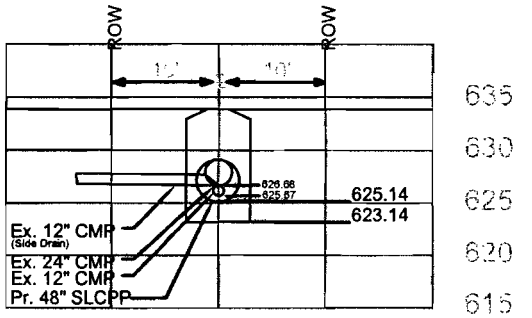
Br2 220+00



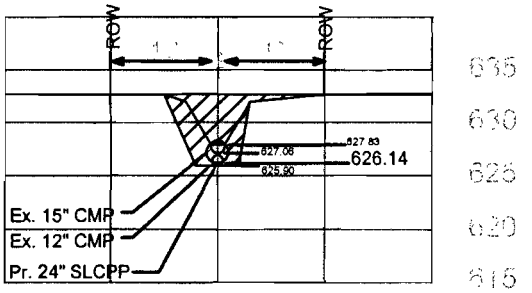
Br2 225+00



Br2 230+00



Br2 235+00

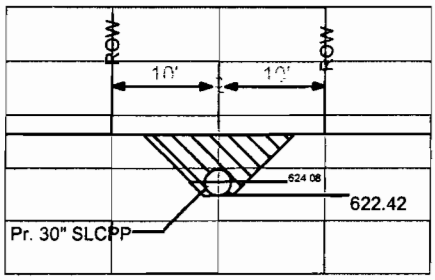


Br2 240+00

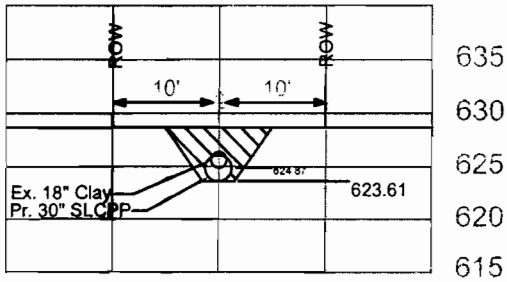
Existing Conditions
Proposed Conditions

Supplemental: Cross Sections

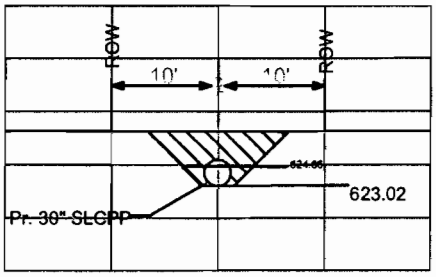
File No. ~~09-74-0061-P~~



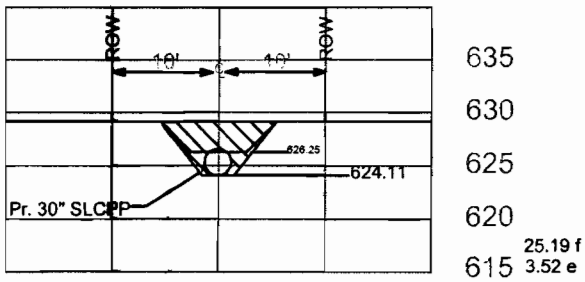
Br3 300+00



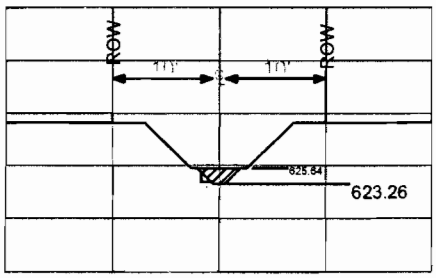
Br3 306+00



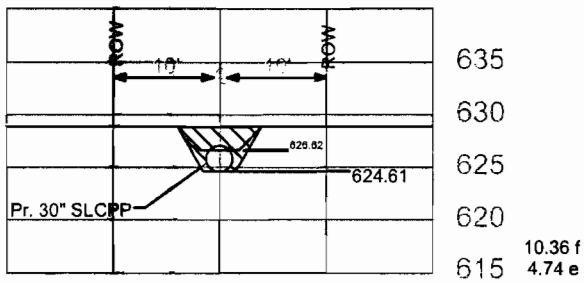
Br3 302+00



Br3 308+00



Br3 304+00



Br3 310+00

Existing Conditions
Proposed Conditions
xx.xx e = excavation volume
xx.xx f = fill volume