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***Surveyor's Annual Report******Regulated Drains******Year 2005*****Regulated Drain Maintenance and Repair Policy Statement****General Condition of Regulated Drains**

The overall condition of regulated drains in Vanderburgh County, Indiana, is very good. The Vanderburgh County Surveyor (Surveyor) continues to work toward open, grassy waterways with three to one (3:1) embankment side slopes as the goal. Where the Surveyor cannot attain the goal due to lack of funds or other restrictions, the second priority is maximum attainable waterway openings with banks stabilized by natural vegetation and other proven materials and methods.

**Urban Development Considerations**

The Surveyor acknowledges the need for piping and otherwise altering, enclosing or bridging regulated drains to promote urban development. When reconstructing drains with pipes, the Surveyor recommends a design capable of conveying the storm water run-off expected from a storm with a return frequency of one hundred years, and generally referred to as the one hundred-year storm.

**Bridge Openings**

Indiana Code 36-9-27-71 requires new bridges and reconstructed bridges to meet structural and hydraulic requirements that will permit a regulated drain to function properly. Observance of this statutory requirement is critical, and the adverse effects of not meeting the structural and hydraulic requirements of proper drain function include increased flood hazard and dramatic boosts in floodplain elevations upstream of inadequately sized culverts and bridges.

The Surveyor continues to work with the Vanderburgh County Engineer, and the Evansville City Engineer, to attain bridge openings sufficient to pass the 100-year storm flow (Q100) without obstructing regulated drains. To achieve Q100 through a bridge opening, the lowest beam elevation under the deck must be set above the Q100 flow elevation, and embankments adjacent to the bridge must be laid back and remain stable to provide a sufficient waterway opening.

Where the Q-100 parameters mentioned above are not attained within the ditch channel, the floodway extends beyond the limits of the ditch banks, and the out-of-bank flow must be accommodated by an unobstructed overland floodway that runs parallel with the ditch. Unfortunately, Vanderburgh County has numerous floodways that exceed the width of existing regulated drains, and a commonly viewed result is a well-constructed bridge sitting high and dry during a flood with the roadway approaches flooded and impassable. If the approaching roadways were raised out of the flood, the roadbed would become a dam, further elevating the upstream floodplain.

#### Single Span Bridges/Single Barrel Pipes

The Surveyor continues to recommend only single span bridges and single barrel pipes be constructed crossing regulated drains in Vanderburgh County to maximize available waterway openings and to minimize possible obstructions caused when debris collects on intermediate bridge piers or pipe diaphragms.

Serious flood incidents result when floodwater is forced out of the channel causing debris to accumulate on bridge piers, low beams, utilities suspended below bridges, double pipe diaphragms, and undersized pipes. Therefore, the Surveyor recommends bridge designs, pipe diameters, and waterway openings capable of conveying Q100, or greater, through the county's system of regulated drains. Where construction and reconstruction achieves the primary goal, studies by government agencies and consulting engineers may show the floodway contained within ditch banks and private property alongside the drain, with minimum land use restrictions to owners and developers.

### FEMA Proposed New Floodplain Maps

The consultants hired by the county to examine the FEMA floodplain study models completed and published their findings in 2003. The findings are available from the Vanderburgh County Building Commissioner.

As anticipated by the Surveyor, the county's consultants discovered specific bridges, culverts, and other structures that appear not to meet the structural and hydraulic requirements for the proper operation of regulated drains. Apparent insufficient structures, using FEMA's flow values, include the following:

- The 159 inch by 117 inch pipe arch in Harper Ditch west of Stockwell Road
- The twin 8 foot diameter culverts carrying Harper Ditch under Norfolk Southern Railroad west of Stockwell Road
- The culverts carrying Harper Ditch under Stockwell Road

The Vanderburgh County Commissioners addressed the deficiencies in Harper Ditch at Stockwell Road by letting a contract to American Consulting Engineers (ACE) to design a bridge sufficient to carry the ditch under Stockwell Road and the railroad.

At the time this report was published, the contractor has just started the Stockwell Road project, and the following conditions continue to impede Harper Ditch:

#### The 159" x 117" Pipe Arch in Harper Ditch West of Stockwell Road

No record is found in the city engineer's office or the county surveyor's office to indicate the purpose, authorization, or construction of the structure.

#### Twin 8-foot Diameter Culverts in Harper Ditch under Norfolk Southern

Harper Ditch historically flows through this structure, but the pipes are not capable of carrying the storm flow from the developed area served by Harper Ditch. However, the structure also drains Wesselman Woods, and should remain in place for that purpose.

### Culverts Carrying Harper Ditch Under Stockwell Road

The Harper Ditch culverts under Stockwell Road are about equal in capacity to the twin 8-foot culverts under Norfolk Southern. However, the pipes under Stockwell Road are not sufficient to carry the storm flow from the developed area served by Harper Ditch.

In a joint effort, the city and county reconstructed Harper Ditch and the Wabash Erie Canal between 1979 and 1982, in accordance with plans prepared by the city engineer, recommended by the county surveyor, and approved by the county drainage board. The plans were designed to create a system of drains to serve the Eastside Urban South Area roughly from Stockwell Road east to the Warrick County Line, and from Lincoln Avenue north to Morgan Avenue.

The 1979 Eastside Urban drain reconstruction plan calls for a new 168" by 116" plate arch culvert placed diagonally under Stockwell Road and Norfolk Southern Railroad for the purpose of shortening and straightening Harper Ditch, and to improve its capacity to carry storm flow through the reconstructed Wabash Erie Canal and to Pigeon Creek.

### Other Issues Regarding the FEMA Proposed Floodplain

#### Coffer Dam in Crawford Brandeis Ditch at Morgan Avenue

At the request of the Surveyor, the local consultants analyzed the effect of installing the planned Stockwell Road culvert, and removing the 159" x 117" culvert west of Stockwell Road. The analysis determined such a reconstruction "could achieve the objective of greatly reducing the backwater flooding upstream." Therefore, the Surveyor recommends the Board pursue, in accordance with IC 36-9-27-71, the original 1979 plan to install a new structure to carry Harper Ditch under Stockwell Road; and to replace the 159" x 117" structure on the west side of Stockwell Road with an open channel.

The purpose of the coffer dam is to direct the flow from lesser and moderate storms directly west through the reconstructed Wabash Erie Canal, Harper Ditch, and thence into Pigeon Creek by a shorter route than previously. The cofferdam was not constructed in total conformity with the plan, but generally serves the intended purpose; however,

FEMA's subcontractor analyzed the cofferdam as if it were constructed per plan. Such an assumption produces incorrect flow values that affect the entire floodplain model.

#### Miscellaneous Issues Regarding FEMA Flood Plain Study

The FIRM maps proposed by FEMA continue to contain gross errors that adversely affect development along regulated drains as well as development of several square miles of land served by East Side Urban regulated drains.

The Surveyor believes, and the study by local consultants implies, there is strong evidence that the FEMA floodplain study contains errors due to the subcontractor's ill configuration of drainage structures, disregard of structures extant at the time of the subcontractor's field work, disregard of updated maps and data available at the time of study, incorrect assumptions regarding channel locations, erroneous assignment of tributary confluence, faulty assignment of flow values, and just plain inexcusable and obvious mistakes.

The initial study completed by the local consultants concluded that apparent errors in the FEMA study may unduly raise the floodplain on the East Side sufficiently to unnecessarily impact future land development. The initial study includes a list of recommendations that the previous county commissioners considered by letting an additional contract to Morley and Associates to complete a more thorough study of the entire East Side Urban South Half Watershed. An extensive study effort by Morley and Associates to correct FEMA's errors continues at the time this report was printed.

#### Phase II Storm Water Rules

New federal and state storm water pollution prevention rules have modified methods recommended by the Surveyor for normal, customary drain maintenance and repair beginning 2003. The Surveyor recommends greater use of grass filter strips, riparian corridors, native vegetation, erosion control fabrics, natural habitat improvement, wetland protection, and other management practices required to achieve compliance with new rules.

Beginning 2003, the Surveyor included and will continue to include requirements for revegetating specific areas of a project where work disturbs, destroys, or otherwise diminishes beneficial ground cover. Ditch maintenance specifications will reflect methods to adequately clear, clean, and maintain regulated drains with less disturbance or destruction of beneficial, natural ground cover.

The Surveyor will develop long-term projects to improve water quality, promote resource conservation, and develop natural habitat through use of practical, proven, and appropriate management practices. Drains initially targeted for water quality improvement and resource conservation are urban drains including Aiken Ditch, Bonnie View Extension, Crawford Brandeis Extension, Eagle Slough, Harper Ditch, Kolb Ditch, Sonntag Stevens, Harper Ditch, and Wabash Erie Canal.

The Surveyor will incorporate USDA Natural Resource Conservation Service recommended practices into the general ditch maintenance program for the agricultural and forested drains particularly in the Northwest and Southwest sections of Vanderburgh County.

#### Specific Conditions by Drain

This report will list regulated drains in Vanderburgh County grouped into geographic areas, and will assign each ditch a general condition.

Where known problems exist within the county's 34 individual drains, this report will identify the conditions requiring specific work other than "normal" annual ditch maintenance.

In some cases, for required emphasis or for clarification, this report will specify the need for intensified "normal" annual ditch maintenance accomplished by herbicide application and mechanical mowing otherwise covered by the General Specifications.

Finally, this report will state need for reconstruction of certain drains and give status of certain drains currently under reconstruction.

## Annual Ditch Maintenance Specifications for 2004

### General Specifications

The General Specifications Section describes annual maintenance of regulated drains in Vanderburgh County determined by the Surveyor to require only "normal" and routine maintenance by herbicide applications or mowing per specifications found in the General Specifications section. The individual ditches to be maintained in accordance with the General Specifications are listed on the first page of the General Specifications Section.

### Special Provisions

The Special Provisions Section details the work required to correct specific problems identified in this report to be beyond normal annual maintenance.

The intent of Special Provisions Section is to address each specific problem with a detailed project to be completed by the Contractor within a specific time limit using specific methods over and above, or at variance with the General Specifications requirements.

All Drains requiring special ditch maintenance work will be listed on the first page of the Special Provisions Section.

### Disclaimer

In some cases, existing conditions identified in this report may not be accomplished in Year 2005 due to: (1) lack of adequate funds, (2) failure of qualified bidders to respond to bid invitations, (3) extended periods of high water, or (4) adverse weather conditions, all as in previous years.

### Additional and Emergency Maintenance

Additional ditch problems may be identified as they occur and are reported to, or discovered by, the Surveyor throughout the year. The Surveyor will present additional specifications and bid documents to address newly discovered conditions throughout the

year as time and funds allow. The Surveyor also will recommend that the Board contract to perform corrective work immediately whenever conditions warrant "emergency" work.

#### Drains Requiring Reconstruction

None at this time

#### Ditch by Ditch Conditions and Recommendations

Union Township Ditches: The Union Township ditches require some dormant brush spraying specified in areas where underbrush has gotten out of control due to limited access by typical maintenance equipment, and specialized equipment may be employed.

Union Twp. Ditches include:

Barnett Ditch is in very good condition.

Cypress Dale/Maddox is in very good condition.

Edmond Ditch is in good condition.

Helfrich/Happe Ditch is in good condition.

Kamp Ditch is in good condition.

#### East Side Urban Drains:

East Side Urban South Half comprises eight (8) interconnected ditches: Bonnie View, Bonnie View Extension, Crawford Brandeis, Hirsch, Kelly, Nurrenbern, Stockfleth and Wabash Erie totaling about five and one half (5.5) miles open ditch and two (2.0) miles of piped drain, draining all land north of Lincoln Ave., east of Green River Rd., west of Warrick County and south of Morgan Ave.

Harper Ditch is connected with ESU-S<sup>1</sup>/<sub>2</sub> and drains most of the heavily developed area east of Stockwell Rd., north of Lincoln Ave., south of Morgan Ave., and west of Fielding Ct. Harper Ditch, however, is maintained with a separate account due to its construction after completion of ESU Drain.

The eight ditches comprising ESU-S<sup>1</sup>/<sub>2</sub> convey storm water runoff northwardly thence westwardly via the old Wabash and Erie Canal, under Morgan Ave., at the northwest corner of Wesselman Woods, thence through a natural slough into Pigeon Creek.

While Harper Ditch is maintained through a separate account, it is integral with ESU-S½. For purposes of this report, Harper Ditch conditions will be included with ESU-S½.

#### Effects of Development on East Side Drains

Except for a 350-acre block of remaining agricultural ground east of Burkhardt Road, north of Virginia Street, south of Oak Grove Road and west of the county line, most of the land served by ESU-S½ is zoned residential or commercial and is under intense development pressure. As a result, land prices have escalated dramatically and developers are compelled to use every square foot of property even including some land within easements and rights-of-way.

Commercial developers and residential homeowners increasingly find open ditches objectionable for a variety of reasons. Unsightliness, weeds, pests, personal safety, reduced land value and increased land use restrictions are complaints most often voiced by property owners requesting piped drains and easement encroachments.

However, new federal and state rules encourage more open, green space; permeable pavements; wide, grassy channels; "constructed wetlands;" native plants; and other infiltration practices that run counter to local public opinion, practical development practices, and customary drainage concepts.

In 2002, the Board declared the Eastside Urban Area north of the Expressway, West of the Warrick County Line, East of Burkhardt Road, and south of Boonville Highway to be an Impacted Drainage Area in accordance with the county drainage ordinance requirements. Impacted Drainage Areas enjoy special considerations, according to code, during site planning to ensure that existing drainage facilities and neighboring properties are not unduly impacted by the establishment of new impervious surfaces on freshly developed land.

#### Current Problems Identified in East Side Urban South Half:

Hirsch Ditch: Accumulation of construction debris in Hirsch Ditch especially in pipes from 5300 to 5800 Morgan Avenue is holding water in the bottom two (2) feet of the ditch for about 1,500 feet back to Burkhardt Road. The Surveyor has developed a preliminary set of plans for consideration. Final plans including specifications must be prepared and presented to IDNR and Corps of Engineers before bids are let in Summer 2005.

Chronic wetness in ditch bottom along Hirsch Ditch is causing embankment failure at numerous sites with Oak Grove Road addresses. Plans and specifications are required to repair embankments after construction debris and other obstructions noted above are removed.

Conditions and Recommendations in Other East Side Urban Drains:

Harper Ditch continues to collect stray shopping carts and assorted debris from shopping centers. Recommendation: Continue special specific work requirements for Harper Ditch including cart and debris removal.

General Note: Due to anticipated costs of work to address each of the special conditions in the ditches listed above, the Surveyor recommends herbicide applications rather than mowing commercial areas of the Eastside Urban Drains and special mowings in residential areas in 2005. This same practice has been employed successfully for the past several years to accumulate sufficient funds to complete needed repairs.

Bonnie View Extension was dipped out and reshaped in 2004. The ditch is in excellent condition and the Surveyor recommends reducing the mowing frequency to allow the recent seeding to establish new vegetation. The reduced mowing will apply to Crawford Brandeis along Burkhardt Road south of Lloyd Expressway as well.

Bonnie View Ditch now has a paved liner along its entire length south of the new Target complex, and requires only occasional hand sweeping and manual removal of accumulated road grit and yard wastes.

Stockfleth, Nurrenbern, Kelley, Crawford Brandeis Extension, and Boesche Ditches are in good condition and require only herbicidal applications in 2005

Other East Side Drains in Knight Township:

Aiken Ditch is in fair condition after recent reconstruction except for the following continuing conditions:

- Undersized and poorly maintained private drive culvert crossings into Pollack Avenue residences restrict flow through ditch.
- County Highway guardrail, lack of road shoulder and extremely steep ditch bank restricts mowing along south shoulder of Pollack Avenue.

A remedy is too expensive and too disruptive to local traffic to consider at this time.

Kolb Ditch is in very good condition. Recommendations include one spring mowing and one fall mowing of the section of Kolb Ditch as follows:

“Section A” beginning at the West Line of Eastland Estates (East Line of Price Park) thence Southeastwardly a total of 2,125 feet to the low water line of the lake in Audubon Estates; and

One fall mowing only of the section of Kolb Ditch as follows:

“Section B” beginning at the South end of a concrete box culvert under I-164 at the North end of Audubon Drive off Pollack Avenue, thence Easterly and under the intersection of Pollack Ave. and Fuquay Road, and terminating at the Knight Township Levee, a total distance of 2,350 feet; and

Herbicide applications to “Section A” and “Section B” including bottom sterilization and side bank broad leaf applications.

Eagle Slough: Knight Township and Pigeon Township: Good condition. Annual Ohio River floodwater continues to prevent sufficient herbicide applications. Continuous deposits of flood debris also pose significant problems. The Surveyor recommends gradually vegetating the maintenance right-of-entry with native, riparian species to promote wildlife habitat and storm water control. The special provision specifications for maintenance of Eagle Slough will reflect the stated goal.

The Surveyor recommends the Board continue to maintain its official contract with Inland Marina to dredge the channel of Eagle Slough to its maximum width from the flood gate on the west side of Waterworks Road, thence to the Ohio River.

Northwest: Armstrong Twp./ Scott Twp. Ditches:

Barr's Creek is in Very good condition. The county surveyor recommends regular annual maintenance of Barr's Creek by customary methods.

Buente Upper Big Creek is in very good condition, except more attentive control of undesirable vegetation is required in isolated portions of the drain.

Pond Flat Main requires silt dipping and reestablishment of the designed bottom and south bank from U.S. 41, westward to the CSX rail line approximately \_\_\_\_\_ lineal feet. The project should include spreading the spoil, re-vegetating disturbed areas, and establishing grass filter strips. The project contemplated for Pond Flat Main requires special permitting from IDNR with stringent conditions that may greatly impact planning and initiation of the work.

Pond Flat Lateral A and Lateral B are in very good condition requiring only regular annual maintenance.

Pond Flat Lateral D, along the west side of CSX rail line, needs embankment repair; however, the available work area lies within wet woodland making the project sensitive to IDNR rules. The Surveyor anticipates a rigid permitting process and recommends additional research and plan development before submitting plans to IDNR for approval.

Rexing Creek, formerly Pond Flat Lateral C, needs silt dipping and reestablishment of the designed bottom and northwest bank along isolated locations upstream of Princeton Road and downstream of Outer Darmstadt Road. The account for Rexing Creek is short of funds to complete necessary work; therefore, the work will be delayed until funds become available, or the work may be completed by individual landowners if approved by the Board.

Baehl, Hoefling, Kneer, Singer, and Wallenmeyer Ditches are in good condition and require only normal annual maintenance.

Maidlow Ditch requires embankment repairs at isolated locations that will be addressed with plans later in 2005.

Henry Ditch: Generally poor condition, but needed improvements exceed benefits and available funds. Current and anticipated residential development within Henry Ditch watershed necessitate rethinking the Surveyor's recommendation to vacate the drain. The Surveyor now recommends dormant spray application for Henry Ditch until plans and funds for its improvement become available.

Sonntag-Stevens Ditch and Keil Ditch draining the Center Township industrial area between Lynch Road and St. George Road remain in very good condition and require only normal annual spraying and mowing in 2005.

Weinshiemer/Williams Ditch needs some work to remove brush from the banks along the county line from Lincoln Avenue north to the Dunn Development. Warrick County normally completes the work with funds transferred from Vanderburgh properties. The Surveyor will contact Warrick County's new surveyor to determine whether he intends to continue the maintenance agreement.

A complete edition of Special Provisions describing work required to correct special problems addressed in this report will be available with publication of the attached Notice to Bidders.

***Notice to Bidders should be advertised February 25 or 28, and again March 4 or 7, 2005; allowing at least ten (10) working days following the second advertisement before bids are due for submittal to Ms. Madelyn Grayson in the County Auditor's office no later than Noon, local time, Tuesday, March 22, 2005.***

***Ms. Grayson will carry the submitted bids to the Commissioners' hearing room to be opened by the County Drainage Board at the March 22 meeting.***

***In past years, after opening the bids and reading them aloud at the March meeting, the Board customarily takes the bids under advisement for a week or two, to allow the Surveyor time to prepare recommendations for bid awards. At the March meeting, the Board sets a special meeting, usually following the first Commissioners' meeting in April, for the purpose of awarding the bids so the contractors can begin work by April 15.***

Report submitted February 22, 2005, by Bill Jeffers, Vanderburgh County Surveyor

NOTICE TO BIDDERS

This Instrument shall serve as Public Notice that Sealed Proposals for the maintenance of Regulated Drains in Vanderburgh County, Indiana by mowing, herbicide application, excavation, hauling, disposal, brush cutting and chipping, and other related activities shall be received by Ms. Madelyn Grayson in Room 208 of the Civic Center by the Vanderburgh County Auditor until Noon local time on Tuesday, March 22, 2005, at which time proposals received shall be delivered to the Vanderburgh County Drainage Board, opened and read aloud at the Board’s regular meeting of that date in the County Council Chambers, Room 301 Administration Building, Civic Center Complex, 1 NW Martin Luther King, Jr. Blvd., Evansville, Indiana. Any proposal received unsealed or past the designated time shall be returned to the bidder unopened.

Proposals must be submitted on approved forms, properly executed, and accompanied by a Certified Check, Cashier’s Check, or other approved security in the amount of five (5) percent of the total bid.

Proposals and securities shall be sealed together in an envelope bearing the name and address of the bidder, and the title of the work; and all prepared according to such particulars as shall be described in this document and in other specification and bid documents available from the Vanderburgh County Surveyor; Room 325 Administration Building, Civic Center Complex; 1 NW Martin Luther King, Jr. Blvd.; Evansville, Indiana, 47708; or by calling (812) 435-5210.

Improperly completed proposals may be disregarded by the Board. Successful bidders shall sign contracts with the Board within five (5) days of the award. A performance bond may be required of the Contractor by the Board. The bid bonds of the unsuccessful bidders will be returned within thirty (30) days of the awards.

APPROVED BY THE VANDERBURGH COUNTY DRAINAGE BOARD:

\_\_\_\_\_  
Cheryl A.W. Musgrave, President

\_\_\_\_\_  
Bill Nix, Vice President

\_\_\_\_\_  
Suzanne M. Crouch, Member

ATTEST:

\_\_\_\_\_  
William J. Fluty, Jr., County Auditor

\_\_\_\_\_  
date

CERTIFIED:

\_\_\_\_\_  
Bill Jeffers, County Surveyor

\_\_\_\_\_  
date