



# VANDERBURGH COUNTY SURVEYOR'S

## 2008 ANNUAL REPORT

### REGULATED DRAINS

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## **SURVEYOR'S 2008 ANNUAL REPORT REGULATED DRAINS**

### **Introduction**

IC 36-9-27, Indiana's drainage statute, requires the Vanderburgh Surveyor (the Surveyor) to file an annual report with the Vanderburgh County Drainage Board (the Board) declaring the condition of the various regulated drains and outlining their maintenance and repair needs.

### **General Condition of Regulated Drains**

The overall condition of regulated drains in Vanderburgh County, Indiana, is good. The 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.

### **Long-Term Water Quality Improvement Projects**

In 2006, the Surveyor, with the approval of the Board, commissioned long-term projects to improve water quality, promote resource conservation, and develop natural habitat through use of practical, proven, and appropriate management practices. Regulated drains in greatest need of long-term improvement projects are those drains more severely impacted by rapid and sustained urban development and, generally, located on the east side of US 41 in Knight and Center townships.

To initiate long-term improvement projects, the Board and the Surveyor employed engineering consultants as special contract deputies to work with the Surveyor to study and evaluate the need to enhance the capability of urban drains to convey stormwater, while incorporating best management practices to treat stormwater run-off from urban land use areas. The drains requiring evaluation and planning immediately included:

- **Aiken**
- **Eagle Slough**
- **East Side Urban South Half (ESU-S<sup>1</sup>/<sub>2</sub>)**
- **Harper and that part of the Old Wabash and Erie Canal that outlets ESU-S<sup>1</sup>/<sub>2</sub>**
- **Kolb**
- **Pond Flat Main**
- **Sonntag-Stevens and Keil**

**Aiken** ditch serves a small but densely populated area on the far southeast side of Evansville. A panhandle of the drain's watershed extends as far west as Green River Road, but most of Aiken

Ditch watershed is bounded on the west by Clayton Drive, on the east by Lynn Road, on the north by Conlin Avenue and on the south by Eagle Slough.

The portion of Aiken Ditch between Pollack Avenue and I-164 receives discharge from a large and complicated system of city drains, and serves as a holding area for K1 pump station before discharging through the levee and into Eagle Slough. Indiana Department of Natural Resources (IDNR) designated wetlands along the south side of I-164, preventing proper maintenance of Akin Ditch as it runs parallel to I-164. Engineering estimates to resolve the problem by rerouting the ditch through an existing borrow pit exceed funds generated by the watershed assessments. The Surveyor currently is reexamining options to address the issue.

Additionally, the installation of guardrail by the county highway department has inhibited the Surveyor's ability to maintain properly Akin especially from Calf Lane thence east along Pollack Avenue. The Surveyor would prefer to relinquish the portion of Aiken Ditch along Pollack Avenue to the county highway department for maintenance as a roadside ditch.

### **Drains Under Consultant Evaluation**

- **Eagle Slough**
- **East Side Urban South Half including parts of Harper**
- **Kolb**
- **Pond Flat Main**
- **Sonntag-Stevens and Keil**

**Condition:** All of the urban drains listed above are subject to specific pressures associated with rapid and sustained urban development throughout the watershed served by each drain.

**Action:** The Board, with the Surveyor, contracted consulting engineers to complete detailed studies and evaluations of each urban drain and develop plans specific to each drain that address long-range, phased improvements with regard to stormwater conveyance and water quality.

**Eagle Slough**, a 30,040 linear foot legal drain ( about 5 ½ miles) empties most of the land on the southeast side of Evansville and a good portion of the Ohio River bottoms stretching from the Ohio River on the West at Waterworks Road near the Levee to about ½ mile east of Green River Road. Roughly diamond-shaped, the watershed reaches as far north as Bellemeade Avenue at its pinnacle and as far south as a point on the Ohio River just west of Wathen Road.



**Figure 1 Beaver Dam Along Eagle Slough**

The Surveyor employed Bernardin and Lochmueller and Associates, Inc. (BLA) to complete a study of Eagle Slough to address its existing and long-term needs and better serve the southeast neighborhoods. The study states that the existing conditions along Eagle Slough were mapped and evaluated to identify stormwater drainage concerns and provide a long-range plan to appropriately address identified deficiencies and support development of best management practices. A central focus on access to Eagle Slough's right-of-way includes drivable access locations to the slough and drivability along the banks for inspections and maintenance activities. Findings reveal that access from city or county roadways is feasible for the western and eastern segments of Eagle Slough and, likely, does not require extensive grading efforts. However, culvert placements across lateral tributaries and stormwater drainage channel structures will be a significant concern. In addition, depending on the anticipated access needs, an improved surface is needed to accommodate heavy equipment. The extent of improved surface will be the most significant cost factor.

The BLA study's long-range plan recommends the following prioritized activities:

1. Remove existing beaver dams
2. Implement a beaver population control program
3. Remove other existing obstructions
4. Implement stormwater runoff quality monitoring

5. Develop improved access from Weinbach Avenue to K3 Pump Station/US 41
6. Develop improved access from Green River Road to K2 Pump Station
7. Develop improved access from K2 Pump Station to Weinbach Avenue
8. Develop improved access from US 41 to Waterworks Road
9. Improve bank failures and other erosion concerns
10. Evaluate detailed hydraulic capacity

The study also notes that the costs associated with the above recommendations total approximately \$660,000 over a 20-year planning period. These estimated costs are in 2007 dollars. Access roadway construction projects have been projected to future costs based on an annual inflation rate of 4 percent.

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

The estimated available funds for work, based on 2008 assessments, for Eagle Slough are **\$55,116.**

**East Side Urban South Half** (ESU S½), including Harper, comprises eight interconnected ditches totaling 5.5 miles of open ditch and 2.0 miles of piped drain, serving all land north of Lincoln Avenue, east of Wesselman Woods, west of Warrick County, and south of Morgan Avenue. The eight individual drains comprising ESU-S½ are **Bonnie View, Bonnie View Extension, Crawford Brandeis, Hirsch, Kelly, Nurrenbern, Stockfleth, Wabash Erie, and Harper**, which is a separate drain.



**Figure 2 East Side Urban—Hirsch Ditch  
West Side of Green River Road  
Looking East**

In 2007, American Structurepoint, Inc., engineering consultants for the Board, studied five areas of interest regarding EUS S½ drains in the primary outlet channels. Those five areas are **hydraulics, sediment and trash accumulation, stream bank stabilization, water chemistry, and biological assessment**. American Structurepoint's study reveals critical issues including inadequately sized culverts and deteriorated structures contributing to conditions FEMA has used to rationalize an increase in the Zone A floodplain for the East Side Urban watershed.

The American Structurepoint's **hydraulic** study recommends specific improvements to keep the Hirsch and Harper ditches functional and to reduce flood potential during the 100-year frequency storm event east of Green River Road. The study recommends replacing three of the five culverts in Hirsch upstream of Green River Road at an estimated cost of \$822,000. The Surveyor and American Structurepoint have obtained all the required permits for INDOT to proceed with the first culvert replacement at Green River Road and Morgan Avenue. The study includes a recommended culvert size, which has been incorporated into INDOT's project design. American Structurepoint's study also identifies all critical areas where stream bank failures and potential obstructions would cause temporary flooding and makes recommendations to improve effective channel conveyance functions and ensure fully open waterways.

The consultant's study of **sediment and trash accumulation** recommends that Hirsch be dredged in conjunction with the culvert replacements to better maintain a uniform grade. A uniform grade will eliminate the large pockets of standing water that can become mosquito-breeding habitat. The channel should be re-graded between the Green River Road and the upstream railroad spurs along State Road 62. Possibly, a community volunteer organization could be enlisted to gather debris in and around the drain during low-flow periods.

The goal of the **stream bank stabilization study** is to lower the probability of a mass wasting event, which could cause temporary flooding upstream on Harper and Hirsch. A secondary objective is to more fully ensure effective channel conveyance and protect adjacent property from stream bank failure and mass wasting. American Structurepoint also recommends Harper's stream bank stabilization on Cullen Avenue, behind Tri-State Racquet Club, be achieved by reducing or eliminating sedimentation of the channel and formulating measures to ensure ongoing form and function of the drain.

**Water chemistry** within the ESU-S½ drain area was studied by collecting water-quality samples at seven locations throughout the watershed. Water samples were collected from Harper, Stockfleth, Crawford-Brandeis, Hirsch, and Wabash Erie Canal. The samples met the established

water-quality standards at each location except for two sample points along Stockfleth. These two sample non-compliant points exceeded the state water-quality standard for E. coli concentrations.

**Biological and habitat sampling** was conducted at the seven water quality sampling locations. All sites selected were shallow enough to wade, facilitating a proper sampling. The biological sampling supplemented the water chemistry/quality data collected, which represents a specific point in time at which the sample was collected and may not be representative of the overall health of the stream. Biological sampling utilizes species collected in the stream to determine the overall health of the stream and changes in water quality over time. Macroinvertebrates found within a stream measure biotic integrity. These macroinvertebrates are also collected to determine water quality by volunteer programs such as Hoosier Riverwatch. The biological sampling indicated that all streams sampled ranged from very poor to good, with the only good rating found at Sample Point #3 (Crawford-Brandeis), and the remainder of the sample points being rated as fairly poor to very poor. Poor quality could be because all of the sampled points have been man-made or have undergone extreme man-made alterations to the stream channel. All but one sample location, Sample Point #1 (Hirsch), was consider not supporting of aquatic life, which could be due in part to the natural conditions of the stream. Some streams are naturally degraded and do not support a wide diversity of macroinvertebrates.

The remaining drains in East Side Urban South Half—Bonnie View, Bonnie View Extension, Kelly, and Nurrenbern—will be studied and evaluated as time and money provide.

**The estimated available funds for work, based on 2008 assessments, for ESU-S½ are \$65,025.**

**Kolb** runs diagonally from Covert Avenue, beginning about a half mile east of Green River Road, then through Price Park, Eastland Estates, Audubon Estates, Chickasaw Park, then under the intersection of Pollack Avenue and Fuquay Road, through the Knight Township Levee, Angel Mounds State Historic Site, and into the Ohio River. Kolb Ditch is a little less than a mile and a half long and drains an area from Dexter Avenue on the west to the Warrick County Line on the east and from the levee on the south to Gum Street on the north. The entire watershed is shaped roughly like an oval running from the northwest to the southeast.

In addition to problems with Kolb ditch as defined by Wessler and Associates within the study area, an inspection crew found wood vegetation covering Kolb legal drain south of the levee, probably the result of the tornado.



**Figure 3 Kolb Legal Drain South of the Levee**

The study recommends grading Area A so that the drain flows in a northwesterly direction towards Covert Avenue. This work is a priority Level 1 and is estimated at \$26,500. A portion of Area B would be graded to flow northwesterly to Seasons Ridge Boulevard and on to the Covert Avenue storm sewer system. The remaining would be graded to flow southeasterly into Eastland Estates. Total estimated project cost for Area B is \$67,000.

Level 2 priority work consists of Areas C, E, and the inlet and outlet portions of Area D. Areas C and E work is intended to provide positive flow through the Eastland Estates and then to the Ohio River levee. Estimated cost for Level 2 reconstructions is \$237,000.

Level 3 entails sealing the bottom of Audubon Estates Lake with betonies. Two methods are offered in the study: (1) the sprinkle method or (2) the mixed blanket method. Estimated costs range from \$57,200 to \$96,000. Total reconstruction to Kolb Ditch is estimated to cost between \$387,000 and \$427,000.

In addition, Kolb requires mechanical removal of silt and heavy vegetative debris, which is not included in the above costs.

**The estimated available funds for work, based on 2008 assessments, for Kolb are \$10,826.**

**Pond Flat Main**, from its easternmost point at U.S. Highway 41, downstream about 3,000 feet to the CSX Railroad, needs reconstruction as recommended by the Surveyor. The channel is

undersized and the elevation of the embankments is unequal on each side, forcing flood water out at various points in an erratic manner during high water events. The plans show widening the ditch bottom to ten feet and laying the ditch banks back at a 3:1 slope. If the railroad bridge were reconstructed to allow passage of the 100-year storm flow, as the IDNR requires of modern bridges, the reconstructed channel would contain and convey the 100-year storm run-off. However, CSX refuses to discuss such an improvement of its bridge and insists on constructing another bridge with



**Figure 4 Pond Flat Main - West Towards CSX Crossing near Hwy 41 South Bound Bridge**

the same undersized opening.

Clark Dietz has developed plans for the reconstruction project, and obtained the environmental permits necessary to initiate the work. The only items remaining are a field meeting with IDNR to go over the plans; a public hearing to view the plans and the estimated costs; and the development of specifications for contractors to bid. The estimated cost of the project exceeds the current account balance, which means there is the possibility the properties benefited would have to pay an increased assessment to cover the cost of construction. The public hearing would be the proper venue to discuss issues such as an increased assessment.

**Sonntag-Stevens and Keil** drain the Center Township industrial area between Lynch and St. George Roads east of US 41 and west of Oak Hill Road. Sonntag-Stevens and Keil are generally in good condition but have sustained some damage from the effects of accelerated run-off from the industrial properties and exhibit some deleterious effects of the polluted stormwater run-off.

In 2006, the Board retained the services of Morley and Associates, Inc. and its subcontractor Williams Creek Consulting, Inc. (WCC) to evaluate Sonntag-Stevens and Keil ditches. The consultants identified a total of 41 points where channel/bank failure, bank and channel erosion,

excessive sedimentation, inadequate vegetative cover, and non-native invasive vegetation exist. In addition, point-source (e.g. pipes) and non-point-source discharge (e.g. swales and channels of stormwater that suggest a polluted condition) are evident.



**Figure 5 Severe Erosion Along East End of Sonntag-Stevens**

Based on the field data collected from the site reconnaissance, and desktop review, the following conclusions are drawn in the Morley/Williams Creek study:

- Ten (10) drainage structures (bridges and culverts) were identified within the site— eight on the Sonntag-Stevens Legal Drain (SSLD) and two on the Keil Legal Drain (KLD).
- Thirty-nine (39) pipe outfalls were identified as encroaching into the SSLD and the KLD within the limits of the defined legal drain boundaries. Severe or significant erosion had occurred due to discharges from the pipes at 10 locations (SSLD and KLD Investigative Study, Summary Table, Section 2.7, pp. 15-16).
- Seventy-five (75) stormwater discharge locations were observed by WCC including 39 point sources and 36 non-point sources. The non-point sources consisted of 33 dry (no visible water) vegetated swales and three wet (visible water) vegetated swales (SSLD and KLD Summary Table Section 2.5, pp. 12-14).
- Discharge of hydrocarbons appeared at Observation Points 25 and 30. At Observation Point 25, WCC noted black colored water discharging from the pipe in the SSLD; at Observation Point 30, WCC noted black stained vegetation immediately below the discharge pipe.
- Soil erosion (exposed soil or head cutting bank failure and sediment deposition) was observed in four areas and considered excessive.
- Japanese Honeysuckle (*Lonicera japonica*), a non-native invasive plant was observed in six areas on the site. Although the vegetation was not observed to impede the

water flow in each respective area, it inhibits the growth of desirable species that would promote bank stabilization.

Furthermore, a recent infestation of cattails, particularly, downstream of the intersection of Hitch Peters and Lynch Roads require intensified herbicide applications in 2008. The Surveyor will include future projects to address bank failures, sediment removal, and better vegetation cover.

Additionally, the Surveyor will forward the discharge point and water pollution observations to MS4 operator, John Stoll, to include in his annual report to Indiana Department of Environmental Management (IDEM).

<p><b>The estimated available funds for work, based on 2008 assessments, on Sonntag-Stevens are <u>\$27,947</u>.</b> <b>The estimated available funds for work, based on 2008 assessments, on Keil are <u>\$16,500</u>.</b></p>
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### **Armstrong and Scott Townships**

The system of regulated drains in Armstrong and Scott Townships in northwestern Vanderburgh County serves an area bordered on the west by Posey County, on the east by Old State Road, on the north by Gibson county, and on the south roughly by a ridgeline following Inglefield Road, Fleener Road, Orchard Road, St. Joe Road, and St. Wendell Road. The system of regulated drains serving the watershed consists of Baehl, Barr's Creek, Buente Upper Big Creek, Hoefling, Kneer, Maasberg, Maidlow Creek, Pond Flat Main, Pond Flat Lateral A, Pond Flat Lateral B, Pond Flat Lateral D, and Rexing Creek.

Since the mid-1960s, Big Creek Ditch Association has performed the annual maintenance and has subcontracted most of the special projects correcting deficiencies in the Armstrong/Scott Township regulated drain system. The drains are in good condition and require only routine maintenance except for special conditions annually identified by resident farmers and the Surveyor's inspection team. When special conditions arise, the Surveyor determines priorities and develops special provisions for the Board's approval to let contracts specific to the problems.

### **Union Township**

Union Township in extreme southwestern Vanderburgh County has a system of drains comprised of improved sloughs serving solely agricultural lands in Union Township. The watershed is bordered on the west by Posey County, on the south and east by the Ohio River, and on the North by the Bayou Creek.

Union Township Ditch Association traditionally submits the lowest bids and adequately maintains the regulated drains in the township, comprised of Barnett, Cypress-Dale, Edmond, Helfrich-Happe, Kamp, and Maddox. Typically, annual maintenance consists of herbicidal spraying,

mowing, isolated brush removal, and occasional dormant herbicidal spray applications in specific areas where underbrush gets out of control due to limited access by typical maintenance equipment. When necessary, the Surveyor recommends contracts with licensed herbicide applicators that have specialized equipment to perform additional maintenance. Otherwise, the Surveyor's 2008 recommendation is a repeat of the same maintenance specifications for the Union Township Drains as in 2007. The Union Township Drains are in good condition.

### **Urban Development Considerations**

The Surveyor acknowledges the need for piping and otherwise altering, enclosing or bridging regulated drains to promote urban land development. When reconstructing a regulated drain with pipes, the Surveyor recommends a design capable of conveying the stormwater run-off expected from a storm with a return frequency of one hundred years, and generally referred to as the one hundred-year storm. To maximize the capacity of pipes and culverts minimizes the potential for backwater flooding of valuable land improvements especially in the urbanized areas of the county.

### **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 floodway that runs parallel with the ditch. Unfortunately, Vanderburgh County has numerous floodways that exceed the width of existing regulated drains. In agricultural areas this condition results in crop loss. In urban areas the condition limits usable land and endangers existing improvements.

## **Single-Span Bridges and Single-Barrel Pipes**

The Surveyor continues to recommend only single-span bridges and single-barrel pipes installed in Vanderburgh County's regulated drains to maximize available waterway openings and to minimize possible obstructions caused when debris collects on intermediate bridge piers or pipe diaphragms generally located in mid-stream where the velocity and carrying capacity should be at their maximum.

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, or just a minimum distance immediately outside the banks, with minimum land use restrictions to owners and developers.

## **FEMA's Proposed New Floodplain Maps**

In 2002, Federal Emergency Management Agency (FEMA) attempted to impose new floodplain maps on Vanderburgh County. The base flood elevations set by FEMA's proposed maps are based on information not current with existing conditions especially within the area bounded on the west by Stockwell Road, on the east by the Warrick County line, on the south by Lincoln Avenue, and on the north by Morgan Avenue.

Unfortunately, FEMA's contractor used antiquated data and did not confirm certain existing structures and conditions in the field. As a result, the maps proposed by FEMA in 2002 showed floodplain elevations grossly expanded over about five (5) square miles of the most valuable development land in Vanderburgh County, potentially restricting development of existing and planned commercial subdivision lots and unnecessarily escalating flood insurance premiums.

In 2003, Vanderburgh County initially hired two consultants and asked the Surveyor to provide a licensed chief deputy and field crew to examine the FEMA floodplain study. The joint effort completed its models and published findings in 2003. The findings, which indicated discrepancies with FEMA's study, are available from the Vanderburgh County Building Commissioner.

Following the county's initial floodplain study, the Vanderburgh County Commissioners addressed the deficiencies in Harper Ditch at Stockwell Road by letting a contract to Ragle, Inc. to

install a new culvert structure designed by American Consulting Engineers (now American Structurepoint). The new Stockwell Road culvert structure passes the Q-100, thereby considerably lowering the floodplain elevation previously assigned by FEMA for the land immediately upstream. However, the south embankment of the Norfolk Southern Railway is unstable and continues to slump every winter, causing an obstruction hazard that the county must remain diligently aware of in case a blockage requires an immediate response.

At this time, the improvements are working satisfactorily with the exception of the twin metal pipes under Norfolk Southern west of Stockwell Road, which frequently become partially blocked with fallen limbs and forest litter that washes out of Wesselman Woods.

In October, Harper ditch bank, through Wesselman Nature Society, was repaired to stabilize the bank and protect an emergency vehicle access into the wooded wetland preserve. The Nature Society's Wednesday work crew volunteered to help in the stabilization, and Daylight Farm Supply donated some of the erosion control mats. A generous grant from Alcoa paid for further erosion control materials and other necessary expenses. The Board contracted with Mark Naas and Sons Excavating to install the materials.

### **Continuing Floodplain Study**

Following the 2003 County Study of East Side Urban South Half, the County engaged Morley and Associates, Inc. to continue and expand the study of the East Side Urban Watershed to provide FEMA with data on which to revise the proposed floodplain mapping and base flood elevations lower than those FEMA intended to impose in 2002. Morley has completed its study, and the Indiana Department of Natural Resources, Division of Water has approved the study's flow rates. FEMA has not yet published the new floodplain maps.

While Morley's study may not lower the base flood elevations as much as the Surveyor had initially anticipated, the study will afford the Board a more clear indication of structures within East Side Urban South Half that still represent obstructions to more full conveyance of stormwater.

Such potential obstructions include, but may not necessarily be limited to the following structures:

- The culvert carrying Hirsch (Old Wabash Erie Canal) under Green River Road
- A series of private drive, railroad, and public road culverts in Hirsch between Green River Road and Burkhardt Road
- The state highway bridge carrying Morgan Avenue over Crawford Brandeis Ditch ½ mile west of Burkhardt Road.
- The bridge carrying Norfolk Southern Railway over Crawford Brandeis Ditch ½ mile west of Burkhardt Road.

The Surveyor, the County Engineer, and the Board currently are working with INDOT to include Structurepoint's enlarged culvert design into the surface widening project at Green River Road and Morgan Avenue (S.R. 62). The increased culvert sizes for Hirsch Ditch at Green River Road, and the other in-line culverts toward Burkhardt Road, will dramatically decrease the extent and depth of the floodplain FEMA assigns for the Burkhardt TIF zone. The Surveyor is encountering some difficulty coordinating the project with INDOT, and funding and Norfolk Southern's degree of cooperation may play negatively into the County's ability to replace the other five undersized culverts.

American Structurepoint has identified other non-structural obstructions not identified by the Morley Study, such as cattail infestations, embankment degradation, and sediment accumulations. These non-structural obstructions will be less expensive to remove or repair. The Surveyor will bring proposed contracts to the Board to address these non-structural conditions throughout the year.

The Surveyor recommends the Board continue Structurepoint's study and evaluation of East Side Urban Drain by extending the study into the upper laterals of the system especially considering the impending annexation and further commercial development of the TIF district served by the drains.

In 2008, the Surveyor recommends continuing engineering services to expand the study of East Side Urban South Half. The expanded study should include identification of conditions that are the same as the initial study but expanded into the laterals serving upper reaches of the watershed.

## **Phase II StormWater Rules**

New federal and state stormwater pollution prevention rules have modified methods recommended by the Surveyor for customary drain maintenance and repair. The Surveyor now 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 newly mandated state and federal rules. New regulations also require identification and elimination of stormwater pollution.

Beginning in 2003, the Surveyor included requirements for revegetating specific areas of a project where work disturbs, destroys, or otherwise diminishes beneficial groundcover. Ditch maintenance specifications will reflect methods to adequately clear, clean, and maintain regulated drains with less disturbance or destruction of beneficial, natural groundcover. Furthermore, these specifications will increase the vigilance with which pollution is identified and eliminated.0

## **General Specifications**

General specifications for customary annual maintenance describe annual maintenance requirements for those regulated drains in Vanderburgh County determined by the Surveyor to require only “normal” and routine maintenance by herbicide applications or mowing. The individual ditches to be maintained in accordance with the General Specifications are listed on the first page of the “General Specifications Section” accompanying this report.

## **Special Provisions**

The “Special Provisions Section” details 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. Such work may include excavation, mechanical brush removal, beaver dam and obstruction removal, embankment repairs, and contractual engineering studies. All drains requiring special ditch maintenance work will be listed on the first page of the “Special Provisions Section” accompanying this report.

## **Disclaimer**

In some cases, required or recommended work identified in this report may not be accomplished in Year 2008 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, and additional specifications and bid documents may be presented to the Board 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.

## **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. Furthermore, 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.

## **Impacted Drainage District**

In 2002, the Board declared the Eastside Urban Area north of the Lloyd 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.

## **Joint Vanderburgh and Warrick Counties Drainage Board**

In 2003, the boards in Vanderburgh and Warrick Counties formed a joint board to address conditions that affect both counties especially for lands served by regulated drains along the Lloyd Expressway, Lincoln Avenue, Oak Grove Road, and for problems with Pigeon Creek.

The Surveyor also recommends the Board reactivate its association with the Warrick County Drainage Board, via the existing Joint Drainage Board, to continue a discussion of improving drainage along the common county line and facilitating development particularly along the Lloyd Expressway in both counties.

## **Special Provisions and Specifications**

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 March 7, and March 14, 2008, to allow 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, April 1, 2008.*

*Ms. Grayson will carry the submitted bids to the Commissioners' hearing room to be opened by the County Drainage Board at the April 1, 2008, meeting.*

*In past years after opening the bids and reading them aloud at the 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 bid opening, the Board sets a special meeting in April, for awarding the bids so the contractors can begin work by April 16, 2008.*

**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 the Office of the Vanderburgh County Auditor, Room 208 of the Civic Center until noon local time on Tuesday, April 1, 2008, 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 Civic Center Complex, One Northwest Martin Luther King Jr. Boulevard, 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, including the name(s) of the drain(s), 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 The Surveyor, Room 325 Civic Center Complex, One Northwest Martin Luther King Jr. Boulevard, Evansville, Indiana, 47708, or by calling (812) 435-5210.**

**The Board may disregard improperly completed proposals. 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:**

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**Jeff Korb, Member**

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**Bill Nix, Member**

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**Troy Tornatta, President**

**ATTEST:**

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

\_\_\_\_\_  
**Date**

**CERTIFIED:**

\_\_\_\_\_  
**Bill Jeffers, the Surveyor**

\_\_\_\_\_  
**Date**