Board of Public Works and Safety Agenda

MEETING DATE: Monday, September 15, 2025, at 11:30 AM
MEETING PLACE: Madison City Hall- Council Chambers
LIVE STREAM LINK: https://www.youtube.com/@CityofMadisonIndianaGovernment

A. Calling of roll and notice of absentees.
B. Approval of minutes
C. Claims
    - General
    - Payroll
D. Adjustments
E. Unfinished business
F. New business
    - Resolution 2025-45B: Street Closing for Parks and Recreation Harvest Festival
    - Resolution 2025-46B: Regarding Transfer of Equipment
    - Parking space closure request from Pakalana Poke Wagon for Sept. 26, 2025
    - Contract between City of Madison and JTL
    - Main Street Pay App #1 2025-1 CCMG
    - MPD SOP 047: Kinetic Energy Projectile Guidelines
    - Madison Indiana Stormwater Technical Standards
    - Appeal to Nuisance Clean Up at 519 Highland
    - PACE Final: 821 Walnut
G. Mayor's comments
H. Public comments
I. Next Meeting: **Monday, October 6, 2025,** at 11:30 AM.
J. Motion to adjourn.

Board Member	Appointing Authority	Term
Mayor Bob Courtney	NA	1/6/2020- 12/31/2027
Dave Carlow	Mayor	1/6/2020- 12/31/2027
Karl Eaglin	Mayor	1/6/2020- 12/31/2027

City of Madison acknowledges its responsibility to comply with the Americans with Disabilities Act of 1990. To assist individuals with disabilities who require special services (i.e. sign interpretative services, alternative audio/visual devices, etc.) for participation in or access to City sponsored public programs, services and/or meetings, the City requests that individuals make requests for these services forty-eight (48) hours ahead of the scheduled program, service and/or meeting. To plan, contact ADA Coordinator at 812-265-8300.

Board of Public Works and Safety Minutes

MEETING DATE: Monday, August 4, 2025, at 11:30 AM
MEETING PLACE: City Hall- Council Chambers

The Board of Public Works and Safety, City of Madison, Indiana, met at 11:30 AM in the Council Chamber, City Hall.

Calling of roll and notice of absentees: Eaglin, Courtney, and Carlow were present (3-0).

Approval of Minutes: Eaglin moved to approve the July 21, 2025, minutes, seconded by Carlow. All in favor, motion carried (3-0).

Claims—General/Payroll: Carlow moved to approve the general and payroll claims as submitted, seconded by Eaglin. All in favor, motion carried (3-0).

Adjustments: None.

Unfinished Business: None.

New business:
Wheel Loader Comparison – Utilities Manager, Brian Jackson: The Wastewater Department evaluated four wheel loader models for use at the Wastewater Treatment Plant and recommends purchasing the CAT 914 loader. After on-site testing, two larger models (CAT 920 and John Deere 444 G) were deemed oversized and cost-prohibitive. Between the remaining options, the CAT 914 was favored over the John Deere 344 P due to its enhanced features such as faster hydraulic cycle times, a rear-view camera, auto bucket kickout, creep speed mode, and superior warranty coverage. The total cost for the CAT 914 is $168,500, with a net cost of $148,500 after trading the current loader to the Street Department for $20,000. **Motion:** Courtney moved to authorize the acquisition of the wheel loader recommendation and transfer through the purchase of the smaller wheel loader to the TSO, seconded by Eaglin. All in favor, motion carried (3-0).

Vine and Elm Parking Plans – Deputy Mayor, Tony Steinhardt: An important part of the Main Street project is the reorganization of parking on the side streets to the north and south of Main Street, as outlined in the parking study and the Main Street Master Plan. The project will also add striping for parking spaces and designated areas for golf cart parking. Vine Street north of Main Street will have angled parking on the east side. Vine Street north of Main Street will have parallel parking on the west side. Vine Street south of Main Street will have angled parking on the east side. Vine Street south of Main Street will have parallel parking on the west side. Elm Street north of Main Street will have parallel parking on the east side. Elm Street north of Main Street will have angled parking on the west side. Elm Street south of Main Street will have angled parking on the east side. Elm Street south of Main Street will have parallel parking on the west side.

Resolution 2025-38B: National Night Out – Aug. 11, 2025: A request was submitted by Shawn Scudder on behalf of the City of Madison, Madison Police Department, and Madison Fire Department to temporarily close a section of Vaughn Drive for the National Night Out event scheduled for Monday, August 11, 2025. The proposed closure would span from the west side of West Street to the east side of Poplar Street, between 4:00 p.m. and 8:00 p.m. The street would be under the supervision and control of the City during that time. **Motion:** Eaglin moved to approve Resolution 2025-38B, seconded by Courtney. All in favor, motion carried (3-0).

Resolution 2025-39B: Farmers Evening Market Street Closing – Aug. 12, 2025: A request was submitted by Brittany Demaree on behalf of the Madison Farmers Market to close specific streets and sidewalks for their event on Tuesday, August 12, 2025, from 5:00 p.m. to 9:00 p.m. The requested closures include the southbound lane of Broadway Street (from the north side of Main Street to the south side of Third Street) and the sidewalks on the north side of Main Street from Main Street to Trinity United Methodist Church and 408 Broadway Street. **Motion:** Carlow moved to approve Resolution 2025-39B and 2025-40B, seconded by Eaglin. All in favor, motion carried (3-0).

Resolution 2025-40B: Farmers Evening Market Street Closing – Sept. 9, 2025: A request was submitted by Brittany Demaree on behalf of the Madison Farmers Market to close designated parking spaces for their event on Tuesday, September 9, 2025, from 4:00 p.m. to 9:00 p.m. The requested closures include parking spaces on the east side of Jefferson Street between Main Street and Second Street, as well as parking spaces on the south side of Main Street between Jefferson Street and the alley east of the Jefferson County Courthouse. **Motion:** Carlow moved to approve Resolution 2025-39B and 2025-40B, seconded by Eaglin. All in favor, motion carried (3-0).

Public Comment re. Resolution 2025-40B: City of Madison resident Jan Vethrus requested that the event organizers and the City ensure courthouse employees are informed about the parking space closings. The courthouse is aware of the closings and has already approved them, and a notice will be given to the employees.

Resolution 2025-41B: Broadway Reunion – Sept. 20, 2025: A request was submitted by Mike Perry on behalf of Eureka Lodge #30 for a street closure related to the Broadway School Reunion and Street Dance on Saturday, September 20, 2025. The proposed closure is for Broadway Street between Fourth and Fifth Streets from 3:00 p.m. to 11:30 p.m. **Motion:** Courtney moved to approve Resolution 2025-41B, seconded by Carlow. All in favor, motion carried (3-0).

PACE Finals – 123 Central and 304 Jefferson – Historic Preservationist, Brenna Haley: 123 Central Avenue is a rehabilitation grant project that has been completed. The scope of work included removing all vinyl siding and replacing it with LP Smart Siding. The owners are requesting the full disbursement of $7,500.00. 304 Jefferson Street is also a completed rehabilitation grant project. The work included window replacement and painting of the structure. While the painting was not part of the approved grant scope, it was completed as part of the overall project. The owners are requesting the full disbursement of $7,500.00. **Motion:** Courtney moved to approve the PACE Finals, seconded by Carlow. All in favor, motion carried (3-0).

Mayor's Comments: There are several construction projects underway across town. The Main Street restoration is set to begin this week, and the work on Clifty Drive is nearing completion. The Residences at Sunrise Crossing are also beginning to take shape, with a couple of buildings now

under construction. With August and September being busy festival months, we encourage everyone to get out and support our local events. A big thank-you to the city departments and DOC crews helping to make these festivals possible.

Public comment: Claude Rottet, 820 Fillmore Alley, voiced concern regarding the groundskeeping of the area in front of his property, in front of the river. He offered to donate $200.00 for the maintenance of the area.

Next meeting: Monday, August 18, 2025, at 11:30 AM.

Adjourn: Courtney moved to adjourn, seconded by Eaglin. All in favor, motion carried (3-0).

Attested:

_____

Shirley Rynearson, Clerk-Treasurer

_____

Mayor Bob Courtney

_____

Karl Eaglin

_____

David Carlow

Board of Public Works and Safety Minutes

MEETING DATE: Tuesday, September 2, 2025, at 11:30 AM
MEETING PLACE: City Hall- Council Chambers

The Board of Public Works and Safety, City of Madison, Indiana, met at 11:30 AM in the Council Chamber, City Hall.

Calling of roll and notice of absentees: Eaglin, Courtney, and Carlow were present (3-0).

Approval of Minutes: Carlow moved to table the approval of the August 4, 2025, minutes until they are reworded for clarity, seconded by Eaglin. All in favor, motion carried (3-0). Eaglin moved to approve the August 18, 2025, minutes, seconded by Carlow. All in favor, motion carried (3-0).

Claims—General/Payroll: Carlow moved to approve the general and payroll claims as submitted, seconded by Eaglin. All in favor, motion carried (3-0).

Adjustments: None.

Unfinished Business: None.

New business:
Contract Between City of Madison and Jacobi, Toombs, and Lanz, LLC: With no representative present to discuss the contract, Courtney moved to table the LPA Consulting Contract, seconded by Carlow. All in favor, motion carried (3-0).

Amendment to Resolution 2025-28B: Balloon Glow change of date – Sept. 7, 2025: A request was submitted by Kim Washer on behalf of Madison Regatta, Inc. and the Riverboat Inn for a street closure in connection with the Madison Regatta Balloon Glow. The only amendment to the request was changing the date from June 14, 2025, to September 7, 2025. Vaughn Drive, from the east side of the Madison/Milton Bridge to Ferry Street, was requested to be closed from 4:00 p.m. to 10:00 p.m. on that date. **Motion:** Eaglin moved to approve the amendment for Resolution 2025-28B, seconded by Courtney. All in favor, motion carried (3-0).

Amendment to Resolution 2025-36B: Unbroken Circle – Sept. 4-6, 2025: The amendment to this resolution adds to the street closure the inclusion of the city's vacant lot at the corner of Jefferson Street and Vaughn Drive. The full resolution is now: Brent Turner, on behalf of the Unbroken Circle Music Festival Committee, presented a request for street and vacant lot closures in connection with the Unbroken Circle Music Festival scheduled for Thursday, September 4, 2025, through Saturday, September 6, 2025. The requested closures would run from Monday, September 1, 2025, at 8:00 a.m. through Monday, September 8, 2025, at 12:00 p.m., and include Vaughn Drive from the east side of Mill Street to the west side of Jefferson Street; Vine Street south of the Visit Madison parking lot to Vaughn Drive; Elm Street south from First Street to Vaughn Drive; Broadway south from the Brown Gym to Vaughn Drive; Poplar Street south from First Street to Vaughn Drive; Central Avenue south from First Street to Vaughn Drive (with homeowner access maintained); West Street from First Street south to Vaughn Drive (as a chicane area for emergency vehicles); First Street between West Street and the entrance to Heritage Apartments; and the City's vacant lot at Jefferson Street and Vaughn Drive. **Motion:** Eaglin moved to approve the amendment for Resolution 2025-36B, seconded by Carlow. All in favor, motion carried (3-0).

PACE Midpoint: 311 East – Historic Preservationist, Brenna Haley: The owners are requesting a midpoint disbursement of $3,750.00. Work so far has included window replacement and front door replacement. They plan to replace the stairs and repaint. **Motion:** Courtney moved to approve PACE Midpoint, seconded by Carlow. All in favor, motion carried (3-0).

PACE Finals – 523 Jefferson Street – Historic Preservationist, Brenna Haley: The structure has undergone painting, window replacements, new gutters and gutter boards, stonewall repairs and tuckpointing, as well as woodwork improvements. The owners are requesting a disbursement of $7,500.00. **Motion:** Carlow moved to approve the PACE Finals, seconded by Eaglin. All in favor, motion carried (3-0).

Mayor's Comments: The City of Madison experienced a busy weekend, and activity will continue throughout the week and into the weekend with various events taking place around town. Residents are advised to exercise caution while traveling, as construction is ongoing on Main Street and the sidewalks. At tonight's City Council meeting, the City's ADA Transition Plan self-evaluation will be presented for public comment. The plan will be available for review at City Hall and on the City of Madison website. Additionally, Crystal Beach will be hosting a special day for residents to bring their dogs to swim tonight.

Public comment: None.

Next meeting: Monday, September 15, 2025, at 11:30 AM.

Adjourn: Carlow moved to adjourn, seconded by Eaglin. All in favor, motion carried (3-0).

Attested:

_____
Shirley Rynearson, Clerk-Treasurer

_____
Mayor Bob Courtney

_____
Karl Eaglin

_____
David Carlow

RESOLUTION 2025-45B

A RESOLUTION OF THE BOARD OF PUBLIC WORKS AND SAFETY OF THE CITY OF MADISON, INDIANA REGARDING STREET AND PARKING AREA CLOSINGS FOR THE CITY OF MADISON PARKS AND RECREATION HARVEST FESTIVAL

WHEREAS, there has been a request filed by Brett Ricketts on behalf of the City of Madison for street and parking area closings in connection with the City of Madison Parks and Recreation Harvest Festival to be held on Saturday, October 25, 2025.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF PUBLIC WORKS AND SAFETY OF THE CITY OF MADISON, INDIANA, that the following streets and parking areas shall be closed from 2:00 p.m. to 8:00 p.m. on Saturday, October 25, 2025:

1) Vaughn Drive from Broadway Street to Ferry Street;

2) All parking spaces on Vaughn Drive from Broadway to Ferry Street; and

3) The Legacy parking lot; and

4) Central Avenue between Vaughn Drive and crosswalk/bollards.

BE IT FURTHER RESOLVED BY THE BOARD OF PUBLIC WORKS AND SAFETY OF THE CITY OF MADISON, INDIANA, that said street, parking lot, and parking spaces as closed shall be under the supervision and control of the City of Madison at the times noted above for the year 2025.

ADOPTED this 15th day of September, 2025.

_____
Bob G. Courtney, Mayor

_____
Karl Eaglin, Member

_____
David Carlow, Member

(SEAL)

ATTEST:

_____
Shirley Rynearson, Clerk-Treasurer

RESOLUTION 2025-46B

A RESOLUTION OF THE BOARD OF PUBLIC WORKS AND SAFETY OF THE CITY OF MADISON, INDIANA REGARDING TRANSFER OF EQUIPMENT

WHEREAS, the City of Madison, Indiana Wastewater Department was authorized on August 4, 2025 to purchase a new CAT 914 wheel loader for use in its operations and to transfer a used CASE 321 D Loader to the Street Department for a purchase price of $20,000.

WHEREAS, the City of Madison, Indiana believes it to be in its best interest to transfer the said equipment as described for continued use.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF PUBLIC WORKS AND SAFETY OF THE CITY OF MADISON, INDIANA, that in consideration of the purchase price as described above, the following equipment shall be transferred from the City of Madison Wastewater Department to the City of Madison Street Department:

Year/Model:	VIN #	Transfer Title From/To:
2003 CASE 321 D Loader	HEL591231	Wastewater Dept. to Street Dept.

BE IT FURTHER RESOLVED BY THE BOARD OF PUBLIC WORKS AND SAFETY OF THE CITY OF MADISON, INDIANA, that the Clerk-Treasurer of the City of Madison is hereby authorized to record the transfer as approved herein.

ADOPTED this 15th day of September 2025.

_____
Bob G. Courtney, Chairman

_____
Karl Eaglin, Member

_____
David Carlow, Member

(SEAL)

ATTEST:

_____
Shirley Rynearson, Clerk-Treasurer

Monday 9/15 @ 11:30

MADISON Indiana

Street/Sidewalk Closing Request Form

Requestor:

Name of Organization/Group: Pakalana's Poke Wagon

Address: 633 Spring St. City: Madison State: In. Zip Code: 47250

Contact Phone: (812) 493-3508

Email Address: Chuckandisa@yahoo.com

Contact:

Contact Person: Isa Center

Address: Same City: _____ State: _____ Zip Code: _____

Contact Phone: (812) 493-3508

Email Address: Same

Closing Information:

Streets to be closed: Main ~~Street~~ St. (Corner @ in front of Ohio Theatre)

From Street: _____ From Date: 9/26/25 From Time: 6 pm

To Street: _____ To Date: 9/26/25 To Time: 9 pm

Date Received: 9/9/25

Event Information:

Name of Event: Viva Aloha Radio Show - Elvis - Inspired

From Time: 6 pm - ~~8 pm~~

To Time: 9 pm

Approval/Acknowledgement:

BPWS	Date	Street Department	Date
Chief of Police	Date	Fire Chief	Date

For questions, please contact Tammy Acosta at 812-265-8300.

* A map highlighting your proposed street closures must also be submitted.

** You must appear before the Board of Public Works and Safety for your request to be considered.

LPA - CONSULTING CONTRACT

This Contract ("this Contract") is made and entered into effective as of _____, 2025 ("Effective Date") by and between the City of Madison, acting by and through its proper officials ("LOCAL PUBLIC AGENCY" or "LPA"), and Jacobi, Toombs and Lanz, LLC ("the CONSULTANT"), a corporation organized under the laws of the State of Indiana.

Des. No.: 2401685

Project Description: **The City of Madison is updating traffic and crosswalk signals at the intersections of Main Street and Mulberry Street and Main Street and West Street. The estimated construction cost, which will be funded in part by Federal Funds, is $605,000.**

RECITALS

WHEREAS, the LPA has entered into an agreement to utilize federal monies with the Indiana Department of Transportation ("INDOT") for a transportation or transportation enhancement project ("the Project"); and

WHEREAS, the LPA wishes to hire the CONSULTANT to provide services toward the Project completion more fully described in Appendix "A" attached hereto ("Services"); and

WHEREAS, the CONSULTANT has extensive experience, knowledge and expertise relating to these Services; and

WHEREAS, the CONSULTANT has expressed a willingness to furnish the Services in connection therewith.

NOW, THEREFORE, in consideration of the following mutual covenants, the parties hereto mutually covenant and agree as follows:

The "Recitals" above are hereby made an integral part and specifically incorporated into this Contract.

SECTION I **SERVICES BY CONSULTANT**. The CONSULTANT will provide the Services and deliverables described in Appendix "A" which is herein attached to and made an integral part of this Contract.

SECTION II **INFORMATION AND SERVICES TO BE FURNISHED BY THE LPA.** The information and services to be furnished by the LPA are set out in Appendix "B" which is herein attached to and made an integral part of this Contract.

SECTION III **TERM**. The term of this Contract shall be from the date of the last signature affixed to this Contract to the completion of the construction contract which is estimated to be 2026. A schedule for completion of the Services and deliverables is set forth in Appendix "C" which is herein attached to and made an integral part of this Contract.

SECTION IV **COMPENSATION**. The LPA shall pay the CONSULTANT for the Services performed under this Contract as set forth in Appendix "D" which is herein attached to and made an integral part of this Contract. The maximum amount payable under this Contract shall not exceed **$122,700.00.**

SECTION V **NOTICE TO PROCEED AND SCHEDULE**. The CONSULTANT shall begin the work to be performed under this Contract only upon receipt of the written notice to proceed from the LPA, and shall deliver the work to the LPA in accordance with the schedule contained in Appendix "C" which is herein attached to and made an integral part of this Contract.

SECTION VI GENERAL PROVISIONS

1. **Access to Records.** The CONSULTANT and any SUB-CONSULTANTS shall maintain all books, documents, papers, correspondence, accounting records and other evidence pertaining to the cost incurred under this Contract, and shall make such materials available at their respective offices at all reasonable times during the period of this Contract and for five (5) years from the date of final payment under the terms of this Contract, for inspection or audit by the LPA, INDOT and/or the Federal Highway Administration ("FHWA") or its authorized representative, and copies thereof shall be furnished free of charge, if requested by the LPA, INDOT, and/or FHWA. The CONSULTANT agrees that, upon request by any agency participating in federally-assisted programs with whom the CONSULTANT has contracted or seeks to contract, the CONSULTANT may release or make available to the agency any working papers from an audit performed by the LPA, INDOT and/or FHWA of the CONSULTANT and its SUB-CONSULTANTS in connection with this Contract, including any books, documents, papers, accounting records and other documentation which support or form the basis for the audit conclusions and judgments.

2. **Assignment; Successors.**

   A. The CONSULTANT binds its successors and assignees to all the terms and conditions of this Contract. The CONSULTANT shall not assign or subcontract the whole or any part of this Contract without the LPA's prior written consent, except that the CONSULTANT may assign its right to receive payments to such third parties as the CONSULTANT may desire without the prior written consent of the LPA, provided that the CONSULTANT gives written notice (including evidence of such assignment) to the LPA thirty (30) days in advance of any payment so assigned. The assignment shall cover all unpaid amounts under this Contract and shall not be made to more than one party.

   B. Any substitution of SUB-CONSULTANTS must first be approved and receive written authorization from the LPA. Any substitution or termination of a Disadvantaged Business Enterprise ("DBE") SUB-CONSULTANT must first be approved and receive written authorization from the LPA and INDOT's Economic Opportunity Division Director.

3. **Audit.** The CONSULTANT acknowledges that it may be required to submit to an audit of funds paid through this Contract. Any such audit shall be conducted in accordance with 48 CFR part 31 and audit guidelines specified by the State and/or in accordance with audit requirements specified elsewhere in this Contract.

4. **Authority to Bind Consultant**. The CONSULTANT warrants that it has the necessary authority to enter into this Contract. The signatory for the CONSULTANT represents that he/she has been duly authorized to execute this Contract on behalf of the CONSULTANT and has obtained all necessary or applicable approval to make this Contract fully binding upon the CONSULTANT when his/her signature is affixed hereto.

5. **Certification for Federal-Aid Contracts Lobbying Activities**.

   A. The CONSULTANT certifies, by signing and submitting this Contract, to the best of its knowledge and belief after diligent inquiry, and other than as disclosed in writing to the LPA prior to or contemporaneously with the execution and delivery of this Contract by the CONSULTANT, the CONSULTANT has complied with Section 1352, Title 31, U.S. Code, and specifically, that:

      i. No federal appropriated funds have been paid, or will be paid, by or on behalf of the CONSULTANT to any person for influencing or attempting to influence an officer or employee of any federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contracts, the making of any federal grant, the making of any federal loan, the

entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

ii. If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this federal Contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

B. The CONSULTANT also agrees by signing this Contract that it shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000, and that all such sub-recipients shall certify and disclose accordingly. Any person who fails to sign or file this required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each failure.

6. **Changes in Work.** The CONSULTANT shall not commence any additional work or change the scope of the work until authorized in writing by the LPA. The CONSULTANT shall make no claim for additional compensation or time in the absence of a prior written approval and amendment executed by all signatories hereto. This Contract may be amended, supplemented or modified only by a written document executed in the same manner as this Contract. The CONSULTANT acknowledges that no claim for additional compensation or time may be made by implication, oral agreements, actions, inaction, or course of conduct.

7. **Compliance with Laws.**

A. The CONSULTANT shall comply with all applicable federal, state and local laws, rules, regulations and ordinances, and all provisions required thereby to be included herein are hereby incorporated by reference. If the CONSULTANT violates such rules, laws, regulations and ordinances, the CONSULTANT shall assume full responsibility for such violations and shall bear any and all costs attributable to the original performance of any correction of such acts. The enactment of any state or federal statute, or the promulgation of regulations thereunder, after execution of this Contract, shall be reviewed by the LPA and the CONSULTANT to determine whether formal modifications are required to the provisions of this Contract.

B. The CONSULTANT represents to the LPA that, to the best of the CONSULTANT'S knowledge and belief after diligent inquiry and other than as disclosed in writing to the LPA prior to or contemporaneously with the execution and delivery of this Contract by the CONSULTANT:

i. *State of Indiana Actions.* The CONSULTANT has no current or outstanding criminal, civil, or enforcement actions initiated by the State of Indiana pending, and agrees that it will immediately notify the LPA of any such actions. During the term of such actions, CONSULTANT agrees that the LPA may delay, withhold, or deny work under any supplement or amendment, change order or other contractual device issued pursuant to this Contract.

ii. *Professional Licensing Standards.* The CONSULTANT, its employees and SUBCONSULTANTS have complied with and shall continue to comply with all applicable licensing standards, certification standards, accrediting standards and any other laws, rules or regulations governing services to be provided by the CONSULTANT pursuant to this Contract.

iii. *Work Specific Standards.* The CONSULTANT and its SUB-CONSULTANTS, if any, have obtained, will obtain and/or will maintain all required permits, licenses, registrations and approvals, as well as comply with all health, safety, and environmental statutes, rules, or regulations in the performance of work activities for the LPA.

iv. *Secretary of State Registration.* If the CONSULTANT is an entity described in IC Title 23, it is properly registered and owes no outstanding reports with the Indiana Secretary of State.

v. *Debarment and Suspension of CONSULTANT.* Neither the CONSULTANT nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from entering into this Contract by any federal agency or by any department, agency or political subdivision of the State and will immediately notify the LPA of any such actions. The term "principal" for purposes of this Contract means an officer, director, owner, partner, key employee, or other person with primary management or supervisory responsibilities, or a person who has a critical influence on or substantive control over the operations of the CONSULTANT or who has managerial or supervisory responsibilities for the Services.

vi. *Debarment and Suspension of any SUB-CONSULTANTS.* The CONSULTANT's SUB-CONSULTANTS are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from entering into this Contract by any federal agency or by any department, agency or political subdivision of the State. The CONSULTANT shall be solely responsible for any recoupment, penalties or costs that might arise from the use of a suspended or debarred SUBCONSULTANT. The CONSULTANT shall immediately notify the LPA and INDOT if any SUB-CONSULTANT becomes debarred or suspended, and shall, at the LPA's request, take all steps required by the LPA to terminate its contractual relationship with the SUB-CONSULTANT for work to be performed under this Contract.

C. *Violations.* In addition to any other remedies at law or in equity, upon CONSULTANT'S violation of any of Section 7(A) through 7(B), the LPA may, at its sole discretion, do any one or more of the following:

i. terminate this Contract; or

ii. delay, withhold, or deny work under any supplement or amendment, change order or other contractual device issued pursuant to this Contract.

D. *Disputes.* If a dispute exists as to the CONSULTANT's liability or guilt in any action initiated by the LPA, and the LPA decides to delay, withhold, or deny work to the CONSULTANT, the CONSULTANT may request that it be allowed to continue, or receive work, without delay. The CONSULTANT must submit, in writing, a request for review to the LPA. A determination by the LPA under this Section 7.D shall be final and binding on the parties and not subject to administrative review. Any payments the LPA may delay, withhold, deny, or apply under this section shall not be subject to penalty or interest under IC 5-17-5.

8. **Condition of Payment.** The CONSULTANT must perform all Services under this Contract to the LPA's reasonable satisfaction, as determined at the discretion of the LPA and in accordance with all applicable federal, state, local laws, ordinances, rules, and regulations. The LPA will not pay for work not performed to the LPA's reasonable satisfaction, inconsistent with this Contract or performed in violation of federal, state, or local law (collectively, "deficiencies") until all deficiencies are remedied in a timely manner.

9. **Confidentiality of LPA Information**.

A. The CONSULTANT understands and agrees that data, materials, and information disclosed to the CONSULTANT may contain confidential and protected information. Therefore, the CONSULTANT covenants that data, material, and information gathered, based upon or disclosed to the CONSULTANT for the purpose of this Contract, will not be disclosed to others or discussed with third parties without the LPA's prior written consent.

B. The parties acknowledge that the Services to be performed by the CONSULTANT for the LPA under this Contract may require or allow access to data, materials, and information containing Social Security numbers and maintained by the LPA in its computer system or other records. In addition to the covenant made above in this section and pursuant to 10 IAC 5-3-1(4), the CONSULTANT and the LPA agree to comply with the provisions of IC 4-1-10 and IC 4-1-11. If any Social Security number(s) is/are disclosed by the CONSULTANT, the CONSULTANT agrees to pay the cost of the notice of disclosure of a breach of the security of the system in addition to any other claims and expenses for which it is liable under the terms of this Contract.

10. **Delays and Extensions.** The CONSULTANT agrees that no charges or claim for damages shall be made by it for any minor delays from any cause whatsoever during the progress of any portion of the Services specified in this Contract. Such delays, if any, shall be compensated for by an extension of time for such period as may be determined by the LPA subject to the CONSULTANT's approval, it being understood, however, that permitting the CONSULTANT to proceed to complete any services, or any part of them after the date to which the time of completion may have been extended, shall in no way operate as a waiver on the part of the LPA of any of its rights herein. In the event of substantial delays or extensions, or change of any kind, not caused by the CONSULTANT, which causes a material change in scope, character or complexity of work the CONSULTANT is to perform under this Contract, the LPA at its sole discretion shall determine any adjustments in compensation and in the schedule for completion of the Services. CONSULTANT must notify the LPA in writing of a material change in the work immediately after the CONSULTANT first recognizes the material change.

11. **DBE Requirements**.

A. Notice is hereby given to the CONSULTANT and any SUB-CONSULTANT, and both agree, that failure to carry out the requirements set forth in 49 CFR Sec. 26.13(b) shall constitute a breach of this Contract and, after notification and failure to promptly cure such breach, may result in termination of this Contract or such remedy as INDOT deems appropriate. The referenced section requires the following assurance to be included in all subsequent contracts between the CONSULTANT and any SUB-CONSULTANT:

> The CONSULTANT, sub recipient or SUB-CONSULTANT shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The CONSULTANT shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the CONSULTANT to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy, as INDOT, as the recipient, deems appropriate.

B. The CONSULTANT shall make good faith efforts to achieve the DBE percentage goal that may be included as part of this Contract with the approved DBE SUB-CONSULTANTS identified on its Affirmative Action Certification submitted with its Letter of Interest, or with approved amendments. Any changes to a DBE firm listed in the Affirmative Action Certification must be requested in writing and receive prior approval by the LPA and INDOT's Economic Opportunity Division Director. After this Contract is completed and if a DBE SUB-CONSULTANT has performed services thereon, the CONSULTANT must complete, and return, a Disadvantaged Business Enterprise Utilization Affidavit ("DBE-3 Form") to INDOT's

Economic Opportunity Division Director. The DBE-3 Form requires certification by the CONSULTANT AND DBE SUB-CONSULTANT that the committed contract amounts have been paid and received.

12. Non-Discrimination.

A. Pursuant to I.C. 22-9-1-10, the Civil Rights Act of 1964, and the Americans with Disabilities Act, the CONSULTANT shall not discriminate against any employee or applicant for employment, to be employed in the performance of work under this Contract, with respect to hire, tenure, terms, conditions or privileges of employment or any matter directly or indirectly related to employment, because of race, color, religion, sex, disability, national origin, ancestry or status as a veteran. Breach of this covenant may be regarded as a material breach of this Contract. Acceptance of this Contract also signifies compliance with applicable federal laws, regulations, and executive orders prohibiting discrimination in the provision of services based on race, color, national origin, age, sex, disability or status as a veteran.

B The CONSULTANT understands that the LPA is a recipient of federal funds. Pursuant to that understanding, the CONSULTANT agrees that if the CONSULTANT employs fifty (50) or more employees and does at least $50,000.00 worth of business with the State and is not exempt, the CONSULTANT will comply with the affirmative action reporting requirements of 41 CFR 60-1.7. The CONSULTANT shall comply with Section 202 of executive order 11246, as amended, 41 CFR 60-250, and 41 CFR 60-741, as amended, which are incorporated herein by specific reference. Breach of this covenant may be regarded as a material breach of Contract.

It is the policy of INDOT to assure full compliance with Title VI of the Civil Rights Act of 1964, the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act and related statutes and regulations in all programs and activities. Title VI and related statutes require that no person in the United States shall on the grounds of race, color or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. (INDOT's Title VI enforcement shall include the following additional grounds: sex, ancestry, age, income status, religion and disability.)

C. The CONSULTANT shall not discriminate in its selection and retention of contractors, including without limitation, those services retained for, or incidental to, construction, planning, research, engineering, property management, and fee contracts and other commitments with persons for services and expenses incidental to the acquisitions of right-of-way.

D. The CONSULTANT shall not modify the Project in such a manner as to require, on the basis of race, color or national origin, the relocation of any persons. (INDOT's Title VI enforcement will include the following additional grounds; sex, ancestry, age, income status, religion and disability).

E. The CONSULTANT shall not modify the Project in such a manner as to deny reasonable access to and use thereof to any persons on the basis of race, color or national origin. (INDOT's Title VI enforcement will include the following additional grounds; sex, ancestry, age, income status, religion and disability.)

F. The CONSULTANT shall neither allow discrimination by contractors in their selection and retention of subcontractors, leasors and/or material suppliers, nor allow discrimination by their subcontractors in their selection of subcontractors, leasors or material suppliers, who participate in construction, right-of-way clearance and related projects.

G. The CONSULTANT shall take appropriate actions to correct any deficiency determined by itself and/or the Federal Highway Administration ("FHWA") within a reasonable time period, not to exceed ninety (90) days, in order to implement Title VI compliance in accordance with INDOT's assurances and guidelines.

H. During the performance of this Contract, the CONSULTANT, for itself, its assignees and successors in interest (hereinafter referred to as the "CONSULTANT") agrees as follows:

(1) Compliance with Regulations: The CONSULTANT shall comply with the Regulation relative to nondiscrimination in Federally-assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this Contract.

(2) Nondiscrimination: The CONSULTANT, with regard to the work performed by it during the Contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The CONSULTANT shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

(3) Solicitations for SUBCONSULTANTS, Including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the CONSULTANT for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential SUBCONSULTANT or supplier shall be notified by the CONSULTANT of the CONSULTANT'S obligations under this Contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

(4) Information and Reports: The CONSULTANT shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the LPA or INDOT to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a CONSULTANT is in the exclusive possession of another who fails or refuses to furnish this information the CONSULTANT shall so certify to the LPA, or INDOT as appropriate, and shall set forth what efforts it has made to obtain the information.

(5) Sanctions for Noncompliance: In the event of the CONSULTANT'S noncompliance with the nondiscrimination provisions of this contract, the LPA shall impose such contract sanctions as it or INDOT may determine to be appropriate, including, but not limited to:

(a) withholding of payments to the CONSULTANT under the Contract until the CONSULTANT complies, and/or

(b) cancellation, termination or suspension of the Contract, in whole or in part.

(6) Incorporation of Provisions: The CONSULTANT shall include the provisions of paragraphs (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

The CONSULTANT shall take such action with respect to any SUBCONSULTANT procurement as the LPA or INDOT may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a CONSULTANT becomes involved in, or is threatened with, litigation with a SUBCONSULTANT or supplier as a result of such direction, the CONSULTANT may request the LPA to enter into such litigation to protect the interests of the LPA, and, in addition, the CONSULTANT may request the United States to enter into such litigation to protect the interests of the United States.

13. Disputes.

A. Should any disputes arise with respect to this Contract, the CONSULTANT and the LPA agree to act promptly and in good faith to resolve such disputes in accordance with this Section 13. Time is of the essence in the resolution of disputes.

B. The CONSULTANT agrees that the existence of a dispute notwithstanding, it will continue without delay to carry out all of its responsibilities under this Contract that are not affected by the dispute. Should the CONSULTANT fail to continue to perform its responsibilities regarding all non-disputed work, without delay, any additional costs (including reasonable attorneys' fees and expenses) incurred by the LPA or the CONSULTANT as a result of such failure to proceed shall be borne by the CONSULTANT.

C. If a party to this Contract is not satisfied with the progress toward resolving a dispute, the party must notify the other party of this dissatisfaction in writing. Upon written notice, the parties have ten (10) business days, unless the parties mutually agree in writing to extend this period, following the written notification to resolve the dispute. If the dispute is not resolved within ten (10) business days, a dissatisfied party may submit the dispute in writing to initiate negotiations to resolve the dispute. The LPA may withhold payments on disputed items pending resolution of the dispute.

14. Drug-Free Workplace Certification.

A. The CONSULTANT hereby covenants and agrees to make a good faith effort to provide and maintain a drug-free workplace, and that it will give written notice to the LPA within ten (10) days after receiving actual notice that an employee of the CONSULTANT in the State of Indiana has been convicted of a criminal drug violation occurring in the CONSULTANT's workplace. False certification or violation of the certification may result in sanctions including, but not limited to, suspension of Contract payments, termination of this Contract and/or debarment of contracting opportunities with the LPA.

B. The CONSULTANT certifies and agrees that it will provide a drug-free workplace by:

i. Publishing and providing to all of its employees a statement notifying their employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the CONSULTANT's workplace and specifying the actions that will be taken against employees for violations of such prohibition;

ii. Establishing a drug-free awareness program to inform its employees of (1) the dangers of drug abuse in the workplace; (2) the CONSULTANT's policy of maintaining a drug-free workplace; (3) any available drug counseling, rehabilitation, and employee assistance programs; and (4) the penalties that may be imposed upon an employee for drug abuse violations occurring in the workplace;

iii. Notifying all employees in the statement required by subparagraph 14.B.i above that as a condition of continued employment, the employee will (1) abide by the terms of the statement; and (2) notify the CONSULTANT of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction;

iv. Notifying in writing the LPA within ten (10) days after receiving notice from an employee under subdivision 14.B.iii(2) above, or otherwise receiving actual notice of such conviction;

v. Within thirty (30) days after receiving notice under subdivision 14.B.iii(2) above of a conviction, imposing the following sanctions or remedial measures on any employee who is convicted of drug abuse violations occurring in the workplace: (1) take appropriate personnel action against the employee, up to and including termination; or (2) require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State or local health, law enforcement, or other appropriate agency; and

vi. Making a good faith effort to maintain a drug-free workplace through the implementation of subparagraphs 14.B.i. through 14.B.v. above.

15. **Employment Eligibility Verification.** The CONSULTANT affirms under the penalties of perjury that he/she/it does not knowingly employ an unauthorized alien.

The CONSULTANT shall enroll in and verify the work eligibility status of all his/her/its newly hired employees through the E-Verify program as defined in IC 22-5-1.7-3. The CONSULTANT is not required to participate should the E-Verify program cease to exist. Additionally, the CONSULTANT is not required to participate if the CONSULTANT is self-employed and does not employ any employees.

The CONSULTANT shall not knowingly employ or contract with an unauthorized alien. The CONSULTANT shall not retain an employee or contract with a person that the CONSULTANT subsequently learns is an unauthorized alien.

The CONSULTANT shall require his/her/its subcontractors, who perform work under this Contract, to certify to the CONSULTANT that the SUB-CONSULTANT does not knowingly employ or contract with an unauthorized alien and that the SUB-CONSULTANT has enrolled and is participating in the E-Verify program. The CONSULTANT agrees to maintain this certification throughout the duration of the term of a contract with a SUB-CONSULTANT.

The LPA may terminate for default if the CONSULTANT fails to cure a breach of this provision no later than thirty (30) days after being notified by the LPA.

16. **Force Majeure.** In the event that either party is unable to perform any of its obligations under this Contract or to enjoy any of its benefits because of fire, natural disaster, acts of God, acts of war, terrorism, civil disorders, decrees of governmental bodies, strikes, lockouts, labor or supply disruptions or similar causes beyond the reasonable control of the affected party (hereinafter referred to as a Force Majeure Event), the party who has been so affected shall immediately give written notice to the other party of the occurrence of the Force Majeure Event (with a description in reasonable detail of the circumstances causing such Event) and shall do everything reasonably possible to resume performance. Upon receipt of such written notice, all obligations under this Contract shall be immediately suspended for as long as such Force Majeure Event continues and provided that the affected party continues to use commercially reasonable efforts to recommence performance whenever and to whatever extent possible without delay. If the period of nonperformance exceeds thirty (30) days from the receipt of written notice of the Force Majeure Event, the party whose ability to perform has not been so affected may, by giving written notice, terminate this Contract.

17. **Governing Laws.** This Contract shall be construed in accordance with and governed by the laws of the State of Indiana and the suit, if any, must be brought in the State of Indiana. The CONSULTANT consents to the jurisdiction of and to venue in any court of competent jurisdiction in the State of Indiana.

18. **Liability.** If the CONSULTANT or any of its SUB-CONSULTANTS fail to comply with any federal requirement which results in the LPA's repayment of federal funds to INDOT the CONSULTANT shall be responsible to the LPA, for repayment of such costs to the extent such costs are caused by the CONSULTANT and/or its SUB-CONSULTANTS.

19. **Indemnification.** The CONSULTANT agrees to indemnify the LPA, and their agents, officials, and employees, and to hold each of them harmless, from claims and suits including court costs, attorney's fees, and other expenses caused by any negligent act, error or omission of, or by any recklessness or willful misconduct by, the CONSULTANT and/or its SUB-CONSULTANTS, if any, under this Contract, provided that if the CONSULTANT is a "contractor" within the meaning of I.C. 8-3-2-12.5, this indemnity obligation shall be limited by and interpreted in accordance with I.C. 8-23-2-12-5. The LPA shall not provide such indemnification to the CONSULTANT.

20. **Independent Contractor.** Both parties hereto, in the performance of this Contract, shall act in an individual capacity and not as agents, employees, partners, joint ventures or associates of one another. The employees or agents of one party shall not be deemed or construed to be the employees or agents of the other party for any purposes whatsoever. Neither party will assume liability for any injury (including death) to any persons, or damage to any property, arising out of the acts or omissions of the agents or employees of the other party. The CONSULTANT shall be responsible for providing all necessary unemployment and workers' compensation insurance for its employees.

21. **Insurance - Liability for Damages.**

A. The CONSULTANT shall be responsible for the accuracy of the Services performed under this Contract and shall promptly make necessary revisions or corrections resulting from its negligence, errors or omissions without any additional compensation from the LPA. Acceptance of the Services by the LPA shall not relieve the CONSULTANT of responsibility for subsequent correction of its negligent act, error or omission or for clarification of ambiguities. The CONSULTANT shall have no liability for the errors or deficiencies in designs, drawings, specifications or other services furnished to the CONSULTANT by the LPA on which the Consultant has reasonably relied, provided that the foregoing shall not relieve the CONSULTANT from any liability from the CONSULTANT'S failure to fulfill its obligations under this Contract, to exercise its professional responsibilities to the LPA, or to notify the LPA of any errors or deficiencies which the CONSULTANT knew or should have known existed.

B. During construction or any phase of work performed by others based on Services provided by the CONSULTANT, the CONSULTANT shall confer with the LPA when necessary for the purpose of interpreting the information, and/or to correct any negligent act, error or omission. The CONSULTANT shall prepare any plans or data needed to correct the negligent act, error or omission without additional compensation, even though final payment may have been received by the CONSULTANT. The CONSULTANT shall give immediate attention to these changes for a minimum of delay to the project.

C. The CONSULTANT shall be responsible for damages including but not limited to direct and indirect damages incurred by the LPA as a result of any negligent act, error or omission of the CONSULTANT, and for the LPA's losses or costs to repair or remedy construction. Acceptance of the Services by the LPA shall not relieve the CONSULTANT of responsibility for subsequent correction.

D. The CONSULTANT shall be required to maintain in full force and effect, insurance as described below from the date of the first authorization to proceed until the LPA's acceptance of the work product. The CONSULTANT shall list both the LPA and INDOT as insureds on any policies. The CONSULTANT must obtain insurance written by insurance companies authorized to transact business in the State of Indiana and licensed by the Department of Insurance as either admitted or non-admitted insurers.

E. The LPA, its officers and employees assume no responsibility for the adequacy of limits and coverage in the event of any claims against the CONSULTANT, its officers, employees, sub-consultants or any agent of any of them, and the obligations of indemnification in Section 19 herein shall survive the exhaustion of limits of coverage and discontinuance of coverage beyond the term specified, to the fullest extent of the law.

F. The CONSULTANT shall furnish a certificate of insurance and all endorsements to the LPA prior to the commencement of this Contract. Any deductible or self-insured retention amount or other similar obligation under the insurance policies shall be the sole obligation of the CONSULTANT. Failure to provide insurance as required in this Contract is a material breach of Contract entitling the LPA to immediately terminate this Contract.

I. Professional Liability Insurance

The CONSULTANT must obtain and carry professional liability insurance as follows: For INDOT Prequalification **Work Types** 1.1, 12.2-12.6 the CONSULTANTS shall provide not less than $250,000.00 professional liability insurance per claim and $250.000.00 aggregate for all claims for negligent performance. For **Work Types** 2.2, 3.1, 3.2, 4.1, 4.2, 5.5, 5.8, 5.11, 6.1, 7.1, 8.1, 8.2, 9.1, 9.2, 10.1 – 10.4, 11.1, 13.1, 14.1 – 14.5, the CONSULTANTS shall carry professional liability insurance in an amount not less than $1,000,000.00 per claim and $1,000,000.00 aggregate for all claims for negligent performance. The CONSULTANT shall maintain the coverage for a period ending two (2) years after substantial completion of construction.

II. Commercial General Liability Insurance

The CONSULTANT must obtain and carry Commercial / General liability insurance as follows: For INDOT Prequalification **Work Types** 2.1, 6.1, 7.1, 8.1, 8.2, 9.1, 9.2, 10.1 - 10.4, 11.1, 13.1, 14.1 - 14.5, the CONSULTANT shall carry $1,000,000.00 per occurrence, $2,000,000.00 general aggregate. Coverage shall be on an occurrence form, and include contractual liability. The policy shall be amended to include the following extensions of coverage:

1. Exclusions relating to the use of explosives, collapse, and underground damage to property shall be removed.

2. The policy shall provide thirty (30) days notice of cancellation to LPA.

3. The CONSULTANT shall name the LPA as an additional insured.

III. Automobile Liability

The CONSULTANT shall obtain automobile liability insurance covering all owned, leased, borrowed, rented, or non-owned autos used by employees or others on behalf of the CONSULTANT for the conduct of the CONSULTANT's business, for an amount not less than $1,000,000.00 Combined Single Limit for Bodily Injury and Property Damage. The term "automobile" shall include private passenger autos, trucks, and similar type vehicles licensed for use on public highways. The policy shall be amended to include the following extensions of coverage:

1. Contractual Liability coverage shall be included.

2. The policy shall provide thirty (30) days notice of cancellation to the LPA.

3. The CONSULTANT shall name the LPA as an additional insured.

IV. Watercraft Liability (When Applicable)

1. When necessary to use watercraft for the performance of the CONSULTANT's Services under the terms of this Contract, either by the CONSULTANT, or any SUB-CONSULTANT, the CONSULTANT or SUB-CONSULTANT operating the watercraft shall carry watercraft liability insurance in the amount of $1,000,000 Combined Single Limit for Bodily Injury and Property Damage, including Protection & Indemnity where applicable. Coverage shall apply to owned, non-owned, and hired watercraft.

2. If the maritime laws apply to any work to be performed by the CONSULTANT under the terms of the agreement, the following coverage shall be provided:

   a. United States Longshoremen & Harbor workers

   b. Maritime Coverage - Jones Act

3. The policy shall provide thirty (30) days notice of cancellation to the LPA.

4. The CONSULTANT or SUB-CONSULTANT shall name the LPA as an additional insured.

V. Aircraft Liability (When Applicable)

1. When necessary to use aircraft for the performance of the CONSULTANT's Services under the terms of this Contract, either by the CONSULTANT or SUB-CONSULTANT, the CONSULTANT or SUB-CONSULTANT operating the aircraft shall carry aircraft liability insurance in the amount of $5,000,000 Combined Single Limit for Bodily Injury and Property Damage, including Passenger Liability. Coverage shall apply to owned, non-owned and hired aircraft.

2. The policy shall provide thirty (30) days notice of cancellation to the LPA.

3. The CONSULTANT or SUB-CONSULTANT shall name the LPA as an additional insured.

22. **Merger and Modification**. This Contract constitutes the entire agreement between the parties. No understandings, agreements or representations, oral or written, not specified within this Contract will be valid provisions of this Contact. This Contract may not be modified, supplemented or amended, in any manner, except by written agreement signed by all necessary parties.

23. **Notice to Parties**: Any notice, request, consent or communication (collectively a "Notice") under this Agreement shall be effective only if it is in writing and (a) personally delivered; (b) sent by certified or registered mail, return receipt requested, postage prepaid; or (c) sent by a nationally recognized overnight delivery service, with delivery confirmed and costs of delivery being prepaid, addressed as follows:

Notices to the LPA shall be sent to:

City of Madison, Indiana
101 West Main Street
Madison, Indiana 47250

Notices to the CONSULTANT shall be sent to:

Josh Darby, P.E.
Jacobi, Toombs and Lanz, LLC
1829 East Spring Street, Suite 201
New Albany, IN 47150

or to such other address or addresses as shall be furnished in writing by any party to the other party. Unless the sending party has actual knowledge that a Notice was not received by the intended recipient, a Notice shall be deemed to have been given as of the date (i) when personally delivered; (ii) three (3) days after the date deposited with the United States mail properly addressed; or (iii) the next day when delivered during business hours to overnight delivery service, properly addressed and prior to such delivery service's cut off time for next day delivery. The parties acknowledge that notices delivered by facsimile or by email shall not be effective.

24. **Order of Precedence; Incorporation by Reference.** Any inconsistency or ambiguity in this Contract shall be resolved by giving precedence in the following order: (1) This Contract and attachments, (2) RFP document, (3) the CONSULTANT's response to the RFP document, and (4) attachments prepared by the CONSULTANT. All of the foregoing are incorporated fully by reference.

25. **Ownership of Documents and Materials**. All documents, records, programs, data, film, tape, articles, memoranda, and other materials not developed or licensed by the CONSULTANT prior to execution of this Contract, but specifically developed under this Contract shall be considered "work for hire" and the CONSULTANT assigns and transfers any ownership claim to the LPA and all such materials ("Work Product) will be the property of the LPA. The CONSULTANT agrees to execute and deliver such assignments or other documents as may be requested by the LPA. Use of these materials, other than related to contract performance by the CONSULTANT, without the LPA's prior written consent, is prohibited. During the performance of this Contract, the CONSULTANT shall be responsible for any loss of or damage to any of the Work Product developed for or supplied by INDOT and used to develop or assist in the Services provided herein while any such Work Product is in the possession or control of the CONSULTANT. Any loss or damage thereto shall be restored at the CONSULTANT's expense. The CONSULTANT shall provide the LPA full, immediate, and unrestricted access to the Work Product during the term of this Contract. The CONSULTANT represents, to the best of its knowledge and belief after diligent inquiry and other than as disclosed in writing prior to or contemporaneously with the execution of this Contract by the CONSULTANT, that the Work Product does not infringe upon or misappropriate the intellectual property or other rights of any third party. The CONSULTANT shall not be liable for the use of its deliverables described in Appendix "A" on other projects without the express written consent of the CONSULTANT or as provided in Appendix "A". The LPA acknowledges that it has no claims to any copyrights not transferred to INDOT under this paragraph.

26. **Payments.** All payments shall be made in arrears and in conformance with the LPA's fiscal policies and procedures.

27. **Penalties, Interest and Attorney's Fees**. The LPA will in good faith perform its required obligations hereunder, and does not agree to pay any penalties, liquidated damages, interest, or attorney's fees, except as required by Indiana law in part, IC 5-17-5, I. C. 34-54-8, and I. C. 34-13-1.

28. **Pollution Control Requirements**. If this Contract is for $100,000 or more, the CONSULTANT:

i. Stipulates that any facility to be utilized in performance under or to benefit from this Contract is not listed on the Environmental Protection Agency (EPA) List of Violating Facilities issued pursuant to the requirements of the Clean Air Act, as amended, and the Federal Water Pollution Control Act, as amended;

ii. Agrees to comply with all of the requirements of section 114 of the Clean Air Act and section 308 of the Federal Water Pollution Control Act, and all regulations and guidelines issued thereunder; and

iii. Stipulates that, as a condition of federal aid pursuant to this Contract, it shall notify INDOT and the Federal Highway Administration of the receipt of any knowledge indicating that a facility to be utilized in performance under or to benefit from this Contract is under consideration to be listed on the EPA Listing of Violating Facilities.

29. **Severability**. The invalidity of any section, subsection, clause or provision of this Contract shall not affect the validity of the remaining sections, subsections, clauses or provisions of this Contract.

30. **Status of Claims**. The CONSULTANT shall give prompt written notice to the LPA any claims made for damages against the CONSULTANT resulting from Services performed under this Contract and shall be responsible for keeping the LPA currently advised as to the status of such claims. The CONSULTANT shall send notice of claims related to work under this Contract to:

31. **Sub-consultant Acknowledgement.** The CONSULTANT agrees and represents and warrants to the LPA, that the CONSULTANT will obtain signed Sub-consultant Acknowledgement forms, from all SUB-CONSULTANTS providing Services under this Contract or to be compensated for Services through this Contract. The CONSULTANT agrees to provide signed originals of the Sub-consultant Acknowledgement form(s) to the LPA for approval prior to performance of the Services by any SUB-CONSULTANT.

32. **Substantial Performance**. This Contract shall be deemed to be substantially performed only when fully performed according to its terms and conditions and any modification or Amendment thereof.

33. **Taxes**. The LPA will not be responsible for any taxes levied on the CONSULTANT as a result of this Contract.

34. **Termination for Convenience.**

A. The LPA may terminate, in whole or in part, whenever, for any reason, when the LPA determines that such termination is in its best interests. Termination or partial termination of Services shall be effected by delivery to the CONSULTANT of a Termination Notice at least fifteen (15) days prior to the termination effective date, specifying the extent to which performance of Services under such termination becomes effective. The CONSULTANT shall be compensated for Services properly rendered prior to the effective date of termination. The LPA will not be liable for Services performed after the effective date of termination.

B. If the LPA terminates or partially terminates this Contract for any reason regardless of whether it is for convenience or for default, then and in such event, all data, reports, drawings, plans, sketches, sections and models, all specifications, estimates, measurements and data pertaining to the project, prepared under the terms or in fulfillment of this Contract, shall be delivered within ten (10) days to the LPA. In the event of the failure by the CONSULTANT to make such delivery upon demand, the CONSULTANT shall pay to the LPA any damage (including costs and reasonable attorneys' fees and expenses) it may sustain by reason thereof.

35. Termination for Default.

A. With the provision of twenty (20) days written notice to the CONSULTANT, the LPA may terminate this Contract in whole or in part if

(i) the CONSULTANT fails to:

1. Correct or cure any breach of this Contract within such time, provided that if such cure is not reasonably achievable in such time, the CONSULTANT shall have up to ninety (90) days from such notice to effect such cure if the CONSULTANT promptly commences and diligently pursues such cure as soon as practicable;

2. Deliver the supplies or perform the Services within the time specified in this Contract or any amendment or extension;

3. Make progress so as to endanger performance of this Contract; or

4. Perform any of the other provisions of this Contract to be performed by the CONSULTANT; or

(ii) if any representation or warranty of the CONSULTANT is untrue or inaccurate in any material respect at the time made or deemed to be made.

B. If the LPA terminates this Contract in whole or in part, it may acquire, under the terms and in the manner the LPA considers appropriate, supplies or services similar to those terminated, and the CONSULTANT will be liable to the LPA for any excess costs for those supplies or services. However, the CONSULTANT shall continue the work not terminated.

C. The LPA shall pay the contract price for completed supplies delivered and Services accepted. The CONSULTANT and the LPA shall agree on the amount of payment for manufactured materials delivered and accepted and for the protection and preservation of the property. Failure to agree will be a dispute under the Disputes clause (see Section 13). The LPA may withhold from the agreed upon price for Services any sum the LPA determine necessary to protect the LPA against loss because of outstanding liens or claims of former lien holders.

D. The rights and remedies of the LPA in this clause are in addition to any other rights and remedies provided by law or equity or under this Contract.

E. **Default by the LPA.** If the CONSULTANT believes the LPA is in default of this Contract, it shall provide written notice immediately to the LPA describing such default. If the LPA fails to take steps to correct or cure any material breach of this Contract within sixty (60) days after receipt of such written notice, the CONSULTANT may cancel and terminate this Contract and institute the appropriate measures to collect monies due up to and including the date of termination, including reasonable attorney fees and expenses, provided that if such cure is not reasonably achievable in such time, the LPA shall have up to one hundred twenty (120) days from such notice to effect such cure if the LPA promptly commences and diligently pursues such cure as soon as practicable. The CONSULTANT shall be compensated for Services properly rendered prior to the effective date of such termination. The CONSULTANT agrees that it has no right of termination for non-material breaches by the LPA.

36. **Waiver of Rights.** No rights conferred on either party under this Contract shall be deemed waived, and no breach of this Contract excused, unless such waiver or excuse is approved in writing and signed by the party claimed to have waived such right. Neither the LPA's review, approval or acceptance of, nor payment for, the Services required under this Contract shall be construed to operate as a waiver of any rights under this Contract or of any cause of action arising out of the performance of this Contract, and the CONSULTANT shall be and remain liable to the LPA in accordance with applicable law for all damages to the LPA caused by the CONSULTANT's negligent performance of any of the Services furnished under this Contract.

37. **Work Standards/Conflicts of Interest.** The CONSULTANT shall understand and utilize all relevant INDOT standards including, but not limited to, the most current version of the Indiana Department of Transportation Design Manual, where applicable, and other appropriate materials and shall perform all Services in accordance with the standards of care, skill and diligence required in Appendix "A" or, if not set forth therein, ordinarily exercised by competent professionals doing work of a similar nature.

38. **No Third-Party Beneficiaries**. This Agreement is solely for the benefit of the parties hereto. Other than the indemnity rights under this Contract, nothing contained in this Agreement is intended or shall be construed to confer upon any person or entity (other than the parties hereto) any rights, benefits or remedies of any kind or character whatsoever.

39. **No Investment in Iran.** As required by IC 5-22-16.5, the CONSULTANT certifies that the CONSULTANT is not engaged in investment activities in Iran. Providing false certification may result in the consequences listed in IC 5-22-16.5-14, including termination of this Contract and denial of future state contracts, as well as an imposition of a civil penalty.

40. **Assignment of Antitrust Claims.** The CONSULTANT assigns to the State all right, title and interest in and to any claims the CONSULTANT now has, or may acquire, under state or federal antitrust laws relating to the products or services which are the subject of this Contract.

[Remainder of Page Intentionally Left Blank]

Non-Collusion.

The undersigned attests, subject to the penalties for perjury, that he/she is the CONSULTANT, or that he/she is the properly authorized representative, agent, member or officer of the CONSULTANT, that he/she has not, nor has any other member, employee, representative, agent or officer of the CONSULTANT, directly or indirectly, to the best of his/her knowledge, entered into or offered to enter into any combination, collusion or agreement to receive or pay, and that he/she has not received or paid, any sum of money or other consideration for the execution of this Contract other than that which appears upon the face of this Contract. **Furthermore, if the undersigned has knowledge that a state officer, employee, or special state appointee, as those terms are defined in IC §4-2-6-1, has a financial interest in the Contract, the Party attests to compliance with the disclosure requirements in IC §4-2-6-10.5.**

In Witness Whereof, the CONSULTANT and the LPA have, through duly authorized representatives, entered into this Contract. The parties having read and understand the forgoing terms of this Contract do by their respective signatures dated below hereby agree to the terms thereof.

CONSULTANT
Jacobi, Toombs and Lanz, LLC

Michael Harris
Michael Harris (Feb 28, 2025 16:31 EST)
Signature

Michael C. Harris, P.E., President
(Print or type name and title)

Attest:

Aaron Sutherland
Signature

Aaron Sutherland, P.E. Transportation Team Leader
(Print or type name and title)

LOCAL PUBLIC AGENCY
City of Madison, Indiana

Signature

(Print or type name and title)

Signature

(Print or type name and title)

Signature

(Print or type name and title)

APPENDIX "A"

SERVICES TO BE FURNISHED BY CONSULTANT:

In fulfillment of this Contract, the CONSULTANT shall comply with the requirements of the appropriate regulations and requirements of the Indiana Department of Transportation and Federal Highway Administration.

The CONSULTANT shall be responsible for performing the following activities:

Task 1 Design Survey
Task 2 Environmental and Historical Document Preparation
Task 3 Signal Design
Task 4 Utility and Railroad Coordination
Task 5 Right-of-Way Certification
Task 6 Design and Plan Preparation

Task 1 Design Survey

Surveyor shall survey the project limits, which consists of the intersections of Main Street and Mulberry Street and Main Street and West Street. Work includes deed research for PL/ROW resolution; field work for control, topo mapping, sanitary/storm structure measurements, low wires across intersection, utility locates (based on 811), pavement striping, building faces and features (surface outlet downspouts). [Due to the age of buildings in the project corridor, it is possible that underground vaults, cellars, tanks or other structures may exist within the survey area. We will locate visible, above ground evidence (lids, grates, access hatches) of these type facilities, but do not consider a detailed exploration of their size or limits a part of this survey]

Task 2 Environmental and Historical Document Preparation

The CONSULTANT shall perform Environmental Services as defined in the approved Engineering Assessment and any addenda to that report when directed. The work may be reviewed by one or some combination of the following: the District, Office of Environmental Services and FHWA. The work will be accomplished following all of the relevant FHWA regulations and guidance documents as well as all other pertinent and applicable federal and state requirements.

All work shall comply with all National Environmental Policy Act (NEPA) and NEPA related regulations and guidelines. The CONSULTANT shall follow the FHWA/INDOT Streamlining Process and comply with INDOT's Procedural Manual for Preparing Environmental Studies and Categorical Exclusion Manual.

The CONSULTANT shall develop the environmental analyses by coordinating with personnel responsible for the development of the project scope as well as the INDOT project manager.

If requested by the INDOT project manager, the CONSULTANT shall attend the initial field meeting to identify potentially sensitive environmental considerations as well as any other field meetings that are necessary to conclude their work.

The CONSULTANT shall be responsible for activities required to successfully complete the environmental documentation required by the NEPA and other pertinent and applicable laws and regulations. If the scope of a project changes following approval of the environmental document, the CONSULTANT may be asked to assess whether the document is still valid, and prepare additional environmental documentation if needed.

The CONSULTANT shall be responsible for notifying landowners and obtaining access as per State laws.

The CONSULTANT shall provide all necessary specialized studies required to complete the environmental document. This may include, but is not limited to, archaeological investigations, air quality modeling, traffic noise

modeling and barrier feasibility analysis, wetland delineations, stream quality analysis, endangered species studies, Section 4(f) documentation, hazardous materials investigations, environmental justice investigations, and cumulative impact studies.

The LPA and INDOT will schedule and conduct public information meetings/hearings. The CONSULTANT shall be responsible for attending and participating in the presentation of information and production of displays/materials needed for INDOT's public information meetings/hearings.

The CONSULTANT shall be responsible for scheduling CAC meetings, coordination meetings, and resource agency coordination meetings as needed. The CONSULTANT will work with the District and/or Central Office staff to address INDOT's public involvement policy.

The CONSULTANT shall act as INDOT's representative at public information meetings and public hearings.

The CONSULTANT will provide other services as directed by INDOT to complete their work.

Deliverables – The environmental document and/or other studies along with the appropriate number of copies will be transmitted to the LPA and INDOT project manager for distribution. The CONSULTANT shall provide copies of all hard-copy and electronic correspondence related to the project if specifically requested to do so by INDOT. Otherwise, the CONSULTANT shall maintain a full record of such correspondence for subsequent review by INDOT at their discretion.

Task 3 Signal Design

The CONSULTANT will design the modernization/upgrade of two signals within the project limits. The existing traffic signals at the intersections of Main Street and Mulberry Street and Main Street and West Street will both be upgraded as part of this project. Traffic Counts will be obtained utilizing Miovision Cameras and will be projected to the future year. Classifications, including pedestrians, will be obtained from these counts in order to design pedestrian clearance intervals.

Task 4 Utility and Railroad Coordination

The CONSULTANT shall perform utility coordination in accordance with the following:

1. The "New Paradigm" for utility coordination, as presented during Utility Coordinator Certification Training, including but not limited to:
   a. "Everyone knows where everyone goes" and
   b. "No surprises to our teammates".
2. 105 IAC 13 Utility Facility Relocations On Construction Contracts.
3. Indiana Design Manual (IDM) Chapter 104 Utility Coordination.

The CONSULTANT shall have an INDOT certified Utility Coordinator as part of the project team.

The CONSULTANT shall have an INDOT certified Utility Coordinator perform the following utility coordination tasks covered in IDM Chapter 104:

1. Present project reports necessary for project delivery such as status reports and risk reports.
2. Recommend work plans for approval including, narrative portion, relocation drawing, cost estimates and proof of property interests.
3. Recommend work plan addendums for approval.
4. Lead or facilitate meetings involving utility specific activities such as 'kick-off' meetings, conflict resolution meetings and reimbursement eligibility meetings.
5. Facilitate the discussion of cost estimates, reimbursement, reimbursable status or agreements with utility companies and INDOT.
6. Review and recommend approval of utility consultants and utility contractors.
7. Review and sign all required letters to utility companies.

8. Prepare and sign all required contract letting documents.
9. Conduct post letting coordination services.

At the start of the Project, the CONSULTANT shall develop and thereafter maintain a schedule of activities to deliver the project. The schedule shall include pre-letting and post-letting utility coordination activities, including but not limited to the following items:

1. Obtain from the INDOT Project Manager:
   a. The target date for the roadway to be open to traffic
   b. The target date for utility relocations to be complete.
2. Send out the initial notice.
3. Meet face to face with utility companies to determine:
   a. What are the utility right of way needs,
   b. What is the basis for reimbursement for the utility facilities, if any,
   c. What is the estimate of cost to relocate the utility facilities,
   d. What is the utility schedule to relocate, if such is necessary
   e. Where would the utility companies relocate their facilities, if such is necessary,
   f. How can the highway project be designed to avoid the utilities
   g. Do the utility companies have elevations for their facilities and is Subsurface-Utility Engineering (SUE) needed.
4. Send out the request for verification.
5. Send out the request for conflict analysis.
6. Send out the request for work plans.
7. Delivery of the utility certificate and utility special provision to the INDOT Oversight Agent and INDOT Project Manager for approval, and.
8. Date each utility will be out of conflict with the highway project.

All utility coordination services are under the direction of an INDOT Oversight Agent who coordinates with the INDOT Project Manager.

The CONSULTANT shall design the project to avoid the relocation of utility facilities when feasible and to minimize the financial impact to the project and to the utilities.

Prior to 30% Plans, the CONSULTANT shall report in writing to the INDOT Project Manager and the INDOT Oversight Agent which utilities may be relocated and the reason they may be relocated.

The CONSULTANT shall conduct office reviews, field reviews, investigations, meetings and communications as needed for utility coordination services.

The CONSULTANT shall prepare notices, letters, drawings and agreements for utility coordination services.

The CONSULTANT shall provide legal notice before entering private property.

The CONSULTANT shall perform constructability reviews of the project and utility relocation work in accordance with the Constructability Manual, http://www.in.gov/indot/2697.htm.

The CONSULTANT shall prepare agreements for reimbursable utility relocation work and utility relocation work that will be performed by the INDOT highway construction contractor.

The CONSULTANT shall determine if utility field check(s), utility coordination meeting(s), and utility conflict resolutions meeting(s) are needed, then schedule and conduct such when needed.

When requested by INDOT, the CONSULTANT shall use subsurface utility engineering locating and designating information when investigating utility conflicts.

The CONSULTANT shall review plan sheets, cross sections, relocation work plans and schedules to verify that identified utility facility conflicts are resolved.

Before 60% design is complete, the CONSULTANT shall have a face to face meeting with utility companies to discuss the following:

1. What are the utility right of way needs,
2. What is the basis for reimbursement for the utility facilities, if any,
3. What is the estimate of cost to relocate the utility facilities,
4. What is the utility schedule to relocate if such is necessary
5. Where would the utility company relocate their facilities if such is necessary,
6. How can the highway project be designed to avoid their facilities
7. Do the utility companies have elevations for their facilities and is SUE needed.

Before 90% design is complete, the CONSULTANT shall deliver to the INDOT Oversight Agent a revised estimate of the reimbursable utility relocation costs.

Before the Ready for Contracts date, the CONSULTANT shall deliver to the INDOT Oversight Agent a work plan for each utility within the area of the project. A work plan includes narrative, drawing, cost estimate and easement documents as applicable. The work plans shall be delivered whether or not utility facility relocations are required.

The CONSULTANT shall upload the following items for all utilities within the area of the project via the INDOT ERMS Web Portal not later than 90 days prior to the contract letting:

1. Utility relocation work plan
2. Utility coordination certificate
3. Utility special provision

The CONSULTANT shall act as a liaison between utility companies and INDOT, answering questions, interpreting plans, coordinating activities, and other actions as needed.

The CONSULTANT shall show proposed sanitary sewer replacements and proposed water main replacements on the construction plans.

Task 5 Right-of-Way Certification

The CONSULTANT shall prepare and submit all necessary documentation to INDOT for Right-of-Way Certification, which certifies that the OWNER has all property or land necessary for the completion of the construction of the project. It is expected that all work will remain within the existing right-of-way and no new right-of-way acquisition will be performed as part of this project.

Task 6 Design and Plan Preparation

The CONSULTANT shall produce a full design of the intersection improvements and produce the required submittals. The final submittal shall consist of all items listed in the Final Tracings Submittal Checklist, including at a minimum revisions and responses to previous reviews, All Project Commitments Report, Contract Preparation Document Summary, Cost Estimate, Plan Set, Design Computation, Environmental Consultation Form, Quantity Calculations, Right-of-Way Certification Letter, Special Provisions Menus – Recurring and Unique, Utility Coordination Certification and Utility Relocation Plans.

APPENDIX "B"

INFORMATION AND SERVICES TO BE FURNISHED BY THE LPA:

The LPA shall furnish the CONSULTANT with the following:

1. Criteria for design and details for signs, signals, lighting, highway and structures such as grades, curves, sight distances, clearances, design loading, etc.

2. Standard Specifications and standard drawings applicable to the project

3. All written views pertinent to the location and environmental studies that are received by INDOT

4. Traffic assignments

5. Necessary permit forms and permit processing (US Army Corps of Engineers, US Coast Guard, and/or Indiana Department of Natural Resources)

6. Available data from the transportation planning process

7. Utility plans available to INDOT covering utility facilities and old highway plans available from INDOT Covering the location of signals and underground conduits throughout the affected areas

8. Provide access to enter upon public and private lands as required for the CONSULTANT to perform work under this Contract

9. Aerial Survey information

10. Existing water quality data

11. All legal services as may be required for the development of the project

12. Geotechnical investigation, if applicable

APPENDIX "C"

SCHEDULE:

No work under this Contract shall be performed by the CONSULTANT until the CONSULTANT receives a written notice to proceed from the LPA.

A schedule based on the Letting Date for this project will be provided after the kickoff meeting.

APPENDIX "D"

COMPENSATION:

A. AMOUNT OF PAYMENT

1. The CONSULTANT shall receive as payment for the work performed under this Contract the total fee not to exceed **$122,700.00,** unless a modification of the Contract is approved in writing by the LPA.

2. The CONSULTANT will be paid for the work performed under Tasks 1 through 6 of Appendix "A" of this Contract on a lump sum basis in accordance with the following schedule:

Task		
1.	Design Survey	$ 15,000.00
2.	Environmental and Historical Document Preparation	$ 45,900.00
3.	Signal Design	$ 22,800.00
4.	Utility and Railroad Coordination	$ 7,500.00
5.	Right-of-Way Certification	$ 6,500.00
6.	Design and Plan Preparation	$ 25,000.00
	TOTAL	**$ 122,700.00**

B. METHOD OF PAYMENT

1. The CONSULTANT may submit a maximum of one (1) invoice per calendar month for work covered under this Contract. The invoice shall be submitted to the LPA. The invoice shall represent the value, to the LPA, of the partially completed work as of the date of the invoice. The CONSULTANT shall attach a summary of tasks completed during the invoice period with the invoice.

2. The LPA, for and in consideration of the rendering of the engineering services provided for in Tasks 1 through 6 of Appendix "A", agrees to pay to the CONSULTANT for rendering such services the fees established above in the following manner:

   a. For completed work and upon receipt of invoices from the CONSULTANT and the approval thereof by the LPA, payments covering the work performed shall be due and payable to the CONSULTANT. From the partial payment thus computed, there shall be deducted all previous partial fee payment made to the CONSULTANT.

3. In the event of a substantial change in the scope, character or complexity of the work on the Project, the maximum fee payable and the specified fee shall be adjusted in accordance with, Section VI, Item 6, Changes in Work, of the General Provisions, set out in the Contract.

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Final Audit Report 2025-02-28

Created:	2025-02-28
By:	Aaron Sutherland (a.sutherland@jtleng.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAALV8Ahs6nEOA0_S98E30QbPsIG9b8Tf6m

"." History

Document created by Aaron Sutherland (a.sutherland@jtleng.com)
2025-02-28 - 9:29:45 PM GMT

Document emailed to Michael Harris (m.harris@jtleng.com) for signature
2025-02-28 - 9:29:50 PM GMT

Document emailed to Aaron Sutherland (a.sutherland@jtleng.com) for signature
2025-02-28 - 9:29:51 PM GMT

Email viewed by Michael Harris (m.harris@jtleng.com)
2025-02-28 - 9:29:57 PM GMT

Email viewed by Aaron Sutherland (a.sutherland@jtleng.com)
2025-02-28 - 9:29:57 PM GMT

Document e-signed by Aaron Sutherland (a.sutherland@jtleng.com)
Signature Date: 2025-02-28 - 9:30:41 PM GMT - Time Source: server

Document e-signed by Michael Harris (m.harris@jtleng.com)
Signature Date: 2025-02-28 - 9:31:15 PM GMT - Time Source: server

Agreement completed.
2025-02-28 - 9:31:15 PM GMT

APPLICATION AND CERTIFICATION FOR PAYMENT

AIA DOCUMENT G702

TO : City of Madson, Indiana
101West Main Street
Madison, IN 47250

PROJECT: Madison 2025-1 CCMG
Street Paving Project

APPLICATION NC 1

PERIOD TO: 8/25/25

PROJECT NOS: 250057

CONTRACT DATI 5/13/25

Distribution to:
- [ ] OWNER
- [ ] ARCHITECT
- [ ] CONTRACTOR
- [ ]
- [ ]

FROM CONTRACTOR:
All Star Paving Inc.
PO Box 1109
Seymour, In. 47274
CONTRACT FOR:

VIA ARCHITECT:
JTL, LLC Consulting Engineers
1829 East Spring Street, Suite 201
New Albany, IN 47150

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM		$ 1,228,675.75
2. Net change by Change Orders		$ 0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2)		$ 1,228,675.75
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)		$ 97,988.00
5. RETAINAGE:		
a. 10 % of Completed Work (Column D + E on G703)	$ $9,798.80	
b. % of Stored Material (Column F on G703)	$ Included in above	
Total Retainage (Lines 5a + 5b or Total in Column I of G703)		$
6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)		$ 88,189.20
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)		$ 0.00
8. CURRENT PAYMENT DUE		**$ 88,189.20**
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)		$ 1,140,486.55

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner		
Total approved this Month		
TOTALS	$0.00	$0.00
NET CHANGES by Change Order	$0.00	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR: All Star Paving Inc,

By: *Kevin R. Hellman, President* Date: 8/27/25

State of: INDIANA County of: JACKSON
Subscribed and sworn to before me this 27th day of August, 2025.
Notary Public: *Tammy L. Magner* Tammy L. Magner
My Commission expires: 08/12/2033.

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED . . . . . $ 88,189.20

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and onthe Continuation Sheet that are changed to conform with the amount certified.)

ENGINEER: Jacobi, Toombs and Lanz, LLC
By: Date: 8-29-2025

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CONTINUATION SHEET

AIA DOCUMENT G703

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.
In tabulations below, amounts are stated to the nearest dollar.
Use Column I on Contracts where variable retainage for line items may apply.

PROJECT: Madison 2025-1 CCMG
Street Paving Project

APPLICATION NO: 1
APPLICATION DATE: 8/25/25
PERIOD TO: 8/25/25
CONTRACTOR'S PROJECT NO: 250057

A	B					C	D	E	F	G	H	I	J
ITEM NO.	DESCRIPTION OF WORK	Scheduled Quantity	Quantity Used	Quantity Used	Unit Price	SCHEDULED VALUE	WORK COMPLETED PREVIOUS APPLICATION (D + E)	WORK COMPLETED THIS PERIOD	MATERIALS PRESENTLY STORED (NOT IN D or E	TOTAL COMPLETED AND STORED TO DATE	%	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
1	Mob / Demob	1.00	**0.5**		$26,200.00	$26,200.00	$0.00	**$13,100.00**		$13,100.00	50.00%	$13,100.00	$1,310.00
2	MOT	1.00	**0.33**		$3,350.00	$3,350.00	$0.00	**$1,105.50**		$1,105.50	33.00%	$2,244.50	$110.55
3	Contractor's Construction Engineering / Stakeout	1.00	**0.33**		$8,910.00	$8,910.00	$0.00	**$2,940.30**		$2,940.30	33.00%	$5,969.70	$294.03
4	Demo / Clearing of ROW	1.00	**0.33**		$14,600.00	$14,600.00	$0.00	**$4,818.00**		$4,818.00	33.00%	$9,782.00	$481.80
5	Erosion Control	1.00	**0.33**		$4,885.00	$4,885.00	$0.00	**$1,612.05**		$1,612.05	33.00%	$3,272.95	$161.21
6	Asphalt Milling	11,025.00			$1.95	$21,498.75	$0.00	**$0.00**		$0.00	0.00%	$21,498.75	$0.00
7	HMA Base, Type C (Patching)	600.00			$112.30	$67,380.00	$0.00	**$0.00**		$0.00	0.00%	$67,380.00	$0.00
8	HMA Surface, Type C	1,200.00			$107.00	$128,400.00	$0.00	**$0.00**		$0.00	0.00%	$128,400.00	$0.00
9	HMA Surface for Approaches, Type C	110.00			$140.00	$15,400.00	$0.00	**$0.00**		$0.00	0.00%	$15,400.00	$0.00
10	Subgrade Repair	350.00			$119.75	$41,912.50	$0.00	**$0.00**		$0.00	0.00%	$41,912.50	$0.00
11	Curb Ramps, Concrete	280.00			$307.25	$86,030.00	$0.00	**$0.00**		$0.00	0.00%	$86,030.00	$0.00
12	Curb, Concrete, 6 Inch, Remove and Replace	3,200.00			$47.55	$152,160.00	$0.00	**$0.00**		$0.00	0.00%	$152,160.00	$0.00
13	Sidewalk, Concrete, 4 Inch	1,400.00			$119.55	$167,370.00	$0.00	**$0.00**		$0.00	0.00%	$167,370.00	$0.00
14	Driveway Approach, Concrete, 6 Inch	250.00			$124.30	$31,075.00	$0.00	**$0.00**		$0.00	0.00%	$31,075.00	$0.00
15	Transverse Mrkng, Thermo, Multi-Component, Crosswalk Line, White, 24"	2,000.00			$10.45	$20,900.00	$0.00	**$0.00**		$0.00	0.00%	$20,900.00	$0.00
16	Pavement Message Marking, Thermoplastic, Lane Indication Arrow	14.00			$207.00	$2,898.00	$0.00	**$0.00**		$0.00	0.00%	$2,898.00	$0.00
17	Line, Thermoplastic, Solid, Yellow, 6 Inch	2,500.00			$2.60	$6,500.00	$0.00	**$0.00**		$0.00	0.00%	$6,500.00	$0.00
18	Line, Thermoplastic, Solid, White, 6 Inch	750.00			$2.60	$1,950.00	$0.00	**$0.00**		$0.00	0.00%	$1,950.00	$0.00
19	Line, Thermoplastic, Solid, White, 6 Inch for Parking Stalls	1,000.00			$6.70	$6,700.00	$0.00	**$0.00**		$0.00	0.00%	$6,700.00	$0.00
20	Transverse Marking, Thermoplastic, Crosshatch Line, White, 12 Inch	2,500.00			$5.20	$13,000.00	$0.00	**$0.00**		$0.00	0.00%	$13,000.00	$0.00
21	Transverse Marking, Thermoplastic, Stop Line, White, 24 Inch	250.00			$10.45	$2,612.50	$0.00	**$0.00**		$0.00	0.00%	$2,612.50	$0.00
22	Curb Painting, Yellow	1,600.00			$14.25	$22,800.00	$0.00	**$0.00**		$0.00	0.00%	$22,800.00	$0.00
23	Adjust Casting to Grade	15.00			$290.60	$4,359.00	$0.00	**$0.00**		$0.00	0.00%	$4,359.00	$0.00
24	Catch Basin	28.00	**8**		$4,501.00	$126,028.00	$0.00	**$36,008.00**		$36,008.00	28.57%	$90,020.00	$3,600.80
25	Pipe, Circular, 12 Inch	1,500.00	**303.8**		$123.00	$184,500.00	$0.00	**$37,367.40**		$37,367.40	20.25%	$147,132.60	$3,736.74
26	Steel Tube Drain, 5" x 5" x 1.8" Thick	300.00	**11**		$94.25	$28,275.00	$0.00	**$1,036.75**		$1,036.75	3.67%	$27,238.25	$103.68
27	Street Signs	10.00			$237.20	$2,372.00	$0.00	**$0.00**		$0.00	0.00%	$2,372.00	$0.00
28	Overhead Signs	6.00			$850.00	$5,100.00	$0.00	**$0.00**		$0.00	0.00%	$5,100.00	$0.00
29	Reset "Yield to Pedestrian" Bollards/Sign	10.00			$1,105.00	$11,050.00	$0.00	**$0.00**		$0.00	0.00%	$11,050.00	$0.00
30	Fire Cistern Decommissioning (Safeload with Flowable Fill)	4.00			$5,115.00	$20,460.00	$0.00	**$0.00**		$0.00	0.00%	$20,460.00	$0.00
31						$0.00	$0.00	**$0.00**		$0.00	#DIV/0!	$0.00	$0.00
	GRAND TOTALS					**$1,228,675.75**	**$0.00**	**$97,988.00**		**$97,988.00**	**7.98%**	**$1,130,687.75**	**$9,798.80**

MADISON CITY POLICE DEPARTMENT	
SUBJECT: KINETIC ENERGY PROJECTILE GUIDELINES	Number: SOP-047
EFFECTIVE DATE:	REVIEW DATE:
AMENDS/SUPERSEDES:	WRITTEN BY: LEXIPOL
NUMBER OF PAGES: 3	

I. PURPOSE

This department is committed to reducing the potential for violent confrontations. Kinetic energy projectiles, when used properly, are less likely to result in death or serious physical injury and can be used in an attempt to de-escalate a potentially deadly situation.

II. POLICY

A. Deployment and Use

Only department-approved kinetic energy munitions shall be carried and deployed. Approved munitions may be used to compel an individual to cease his/her actions when such munitions present a reasonable option.

Officers are not required or compelled to use approved munitions in lieu of other reasonable tactics if the involved officer determines that deployment of these munitions cannot be done safely. The safety of hostages, innocent persons and officers takes priority over the safety of individuals engaged in criminal or suicidal behavior.

Circumstances appropriate for deployment include, but are not limited to, situations in which:

(1) The suspect is armed with a weapon and the tactical circumstances allow for the safe application of approved munitions.

(2) The suspect has made credible threats to harm him/herself or others.

(3) The suspect is engaged in riotous behavior or is throwing rocks, bottles or other dangerous projectiles at officers, other department members and/or other people.

(4) There is probable cause to believe that the suspect has already committed a crime of violence and is refusing to comply with lawful orders.

B. Deployment Considerations

Before discharging projectiles, the officer should consider such factors as:

(1) Distance and angle to target.

(2) Type of munitions employed.

(3) Type and thickness of subject's clothing.

(4) The subject's proximity to others.

(5) The location of the subject.

(6) Whether the subject's actions dictate the need for an immediate response and the use of control devices appears appropriate.

A verbal warning of the intended use of the device should precede its application, unless it would otherwise endanger the safety of officers or when it is not practicable due to the circumstances. The purpose of the warning is to give the individual a reasonable opportunity to voluntarily comply and to warn other officers and individuals that the device is being deployed.

Officers should keep in mind the manufacturer's recommendations and their training regarding effective distances and target areas. However, officers are not restricted solely to use according to manufacturer recommendations. Each situation must be evaluated on the totality of circumstances at the time of deployment.

The need to immediately incapacitate the suspect must be weighed against the risk of causing serious injury or death. The head and neck should not be intentionally targeted, except when the officer reasonably believes the suspect poses an imminent threat of serious bodily injury or death to the officer or others.

Officers should seek medical treatment for any subject complaining of pain, exhibiting an obvious injury, or requesting medical attention.

C. Safety Considerations

Shotguns specifically designated for use with kinetic energy projectiles will be specially marked in a manner that makes them readily identifiable as such.

Officers will inspect shotguns and projectiles at the beginning of each shift to ensure that the shotguns are in proper working order and the projectiles are of the approved type and appear to be free from defects.

When they are not deployed, shotguns will be unloaded and properly and securely stored in police department vehicles. When deploying a kinetic energy projectile shotgun, officers shall visually inspect the kinetic energy projectiles to ensure that conventional ammunition is not being loaded into the shotgun.
Absent compelling circumstances, officers who must transition from conventional ammunition to kinetic energy projectiles will employ the two-person rule for loading. The two-person rule is a safety measure in which a second officer watches the unloading and loading process to ensure that the weapon is completely emptied of conventional ammunition.

D. Training for Control Devices

The Training Coordinator shall ensure that those members who are authorized to carry a control device have been properly trained and certified to carry the specific control device and are retrained or recertified as necessary. Before being authorized to carry any control device, members will be given access to and receive training on this policy.

(1) Proficiency training shall be monitored and documented by a certified, control-device weapons or tactics instructor.

(2) All training and proficiency for control devices will be documented in the member's training file.

(3) Members who fail to demonstrate proficiency with the control device or knowledge of the Use of Force Policy and the LETB Uniform Statewide policies on Deadly Force and Defensive Tactics Training Program will be provided remedial training. If a member cannot demonstrate proficiency with a control device or knowledge of the Use of Force Policy and the LETB Uniform Statewide policies on Deadly Force and Defensive Tactics Training Program after remedial training, the member will be restricted from carrying the control device and may be subject to discipline.

(4) Retraining or recertification should occur at least biennially.

E. Reporting Use of Control Devices

Any application of a control device shall be documented in the related incident report and reported pursuant to the Use of Force Policy and the LETB Uniform Statewide Policy on Deadly Force.

Summary of the Stormwater Technical Standards Manual for the City of Madison, Indiana

The Stormwater Technical Standards Manual for Madison, Indiana, is a comprehensive guide designed to assist developers, designers, and plan reviewers with technical requirements and methodologies for effective stormwater management. It aligns with regulations from the Indiana Department of Environmental Management (IDEM) and the City's Stormwater Management Ordinance, though the ordinance itself remains the governing authority in case of any conflict.

The manual covers a broad range of topics, from runoff rate calculations and detention storage volume methodologies to storm sewer and open channel design standards. It emphasizes pollution prevention during construction and mandates post-construction best management practices (BMPs) to maintain water quality. Key technical components include runoff rate determination using the Rational Method for smaller sites and computer modeling for larger developments, hydrological modeling for detention storage sizing, and detailed standards for erosion control, sediment management, and stormwater pollution prevention plans (SWPPP).

Additionally, the manual includes specific requirements for drainage easements, compensatory floodplain storage, and construction site access controls. Compliance requires submission of detailed plans, hydrologic analyses, and ongoing inspection and maintenance of stormwater facilities. Appendices provide definitions, standard forms, and BMP fact sheets to support users in adhering to the manual's guidelines.

Ultimately, the document aims to promote sustainable stormwater management practices, protect water resources, and fulfill federal and local regulatory requirements, including those under the Clean Water Act and the National Pollutant Discharge Elimination System (NPDES).

Key Elements

- Integrated Runoff and Storage Methodologies Enhance Flood Resilience:
  The manual's dual approach—using Rational Method for smaller sites and sophisticated computer modeling for larger areas—allows for tailored runoff calculations that more accurately reflect site-specific conditions. This stratification optimizes resource allocation by applying detailed hydrological assessments where complexity demands, thereby improving flood mitigation.
- Emphasis on Construction Pollution Control Reflects Growing Environmental Accountability:
  Detailed requirements for stormwater pollution prevention plans (SWPPP), sediment control, and hazardous waste management highlight a proactive stance on limiting construction-related water pollution. This addresses a critical phase often responsible for significant sediment and contaminant discharge, thereby reducing downstream environmental impacts.

- Post-Construction BMPs as a Long-Term Water Quality Safeguard:
  The inclusion of BMP sizing methodologies and performance standards recognizes that stormwater management extends beyond construction. Post-construction controls such as infiltration practices and vegetative buffers sustain water quality improvements, reduce pollutant loads, and protect aquatic ecosystems.
- Drainage Easements and Compensatory Storage Ensure Functional and Legal Stormwater Management:
  By mandating adequate easements and compensatory floodplain storage, the manual ensures both access for maintenance and preservation of natural floodplain functions. This reduces the risk of infrastructure failure and maintains community resilience to extreme weather events.
- Comprehensive Design Standards Promote Infrastructure Longevity and Efficiency:
  Detailed specifications for storm sewer materials, channel design, and detention basins standardize construction quality, facilitate maintenance, and enhance system reliability. This not only protects public investments but also helps prevent costly repairs resulting from premature failures.
- Documentation and Regulatory Alignment Foster Accountability and Transparency:
  The requirement for detailed applications, inspection reports, and maintenance agreements establishes a clear framework for compliance monitoring. Coupled with adherence to federal and state regulations, this framework supports enforceability and encourages responsible project management.
- Manual as a Non-Regulatory but Essential Technical Reference:
  Despite not being regulatory, the manual's comprehensive methodologies and standards serve as indispensable tools to guide technical decision-making. The deference to the City's ordinance in case of conflict underscores the layered nature of regulatory compliance, while the manual offers consistency and clarity for practitioners.

Furthermore, the manual's appendices and forms provide practical tools for implementation, promoting consistency and ease of compliance documentation. This administrative support is vital for both municipal staff and developers to track progress, inspections, and responsibilities clearly.

Finally, the manual's alignment with federal programs like the NPDES and the Clean Water Act ensures that Madison's stormwater management practices meet broader environmental standards, positioning the city to secure necessary permits and avoid regulatory penalties.

In conclusion, the Stormwater Technical Standards Manual for the City of Madison, Indiana offers a comprehensive technical framework that integrates hydrological science, engineering standards, pollution prevention, and regulatory compliance. It supports sustainable development by protecting water resources, minimizing flood risks, and promoting environmental stewardship through well-defined procedures and best practices. This manual is an essential resource for all stakeholders involved in stormwater management within the city, fostering resilient and responsible urban growth.

STORMWATER TECHNICAL STANDARDS MANUAL CITY OF MADISON, INDIANA

August 2025 Draft

TABLE OF CONTENTS

Chapter One

INTRODUCTION AND APPROVAL PROCEDURES

A. INTRODUCTION

This document, the City of Madison Stormwater Technical Standards Manual contains the necessary technical standards for administering the requirements of the Indiana Department of Environmental Management (IDEM) Municipal Separate Storm Sewer System General Permit (MS4GP), IDEM Construction Stormwater General Permit, and the City of Madison Stormwater Management Ordinance. This document should be considered as a companion document to the Ordinance. Whereas the Ordinance contains the majority of the regulatory authority and general requirements of comprehensive stormwater management, this document contains the necessary means and methods for achieving compliance with the Ordinance. It is not intended as a regulatory document, but rather guidance to assist plan reviewers, developers, and designers. In case there are conflicts between the requirements contained in this document and the ordinance, the requirements of the Ordinance should prevail.

This document contains formulas and methodologies for the review and design of both stormwater quantity and stormwater quality facilities. Chapters 2 through 6 contain stormwater conveyance and detention calculations and requirements. Chapter 7 contains information on erosion control requirements and other pollution prevention measures for active construction sites. Chapters 8 through 9 cover calculations required to properly size and design stormwater quality features that will treat runoff long-term following construction completion. Chapter 10 contains miscellaneous standards regarding grading and building pad elevations, acceptable outlet and adjoining property impact requirements, no net loss floodplain storage requirements, and the requirements associated with proposed dams or levees. A comprehensive glossary of terms is provided in Appendix A. Appendix B contains several useful and necessary standard forms. Best Management Practices (BMPs) for erosion control measures during the construction phase are contained in Appendix C. .

B. DRAINAGE EASEMENT REQUIREMENTS

All new public or through drainage facilities shall be placed in Drainage Easements (DE's) and shall be designated on the record plat as DE's. There shall be no trees or shrubs planted, nor any structures or fences erected in any DE without appropriate approval from the City. The following DE's shall be provided for the noted stormwater facilities:

1. Storm Sewers:

Depth of Storm Pipe from Finish Grade to Crown	Diameter of Storm Pipe	Minimum Easement Width
3 Feet or Less	15 Inches or Less	15 feet
Greater than 3 Feet	15 Inches or Less	20 feet
3 Feet or Less	Greater than 15 Inches	20 feet
Greater than 3 Feet	Greater than 15 Inches	25 feet

Easement width requirements may be modified by the City based on individual site conditions.

2. A minimum of 25 feet from top of the bank on each side of a new channel shall be designated as a DE. Rear-yard swales shall have a minimum DE width of 20 feet total, generally measured 10 feet from each side of the centerline of the swale.

3. 100-year emergency overflow paths and emergency overflow routes associated with detention ponds shall be provided with a DE having a minimum width of 30 feet width (15 feet from centerline on each side). Additional width of drainage easements may be required where conditions warrant.

4. A minimum of 20 feet beyond the actual footprint (top of the bank) of stormwater detention facilities shall be designated as a DE. A minimum 25-foot wide DE shall also be required as access easement, unless the detention facility is immediately next to a public right-of-way.

5. When the City accepts the stormwater improvements into its system, the following statement shall become part of the Restrictive Covenants of every platted subdivision and shown on recorded plat: "*storm sewers and tile drains within designated drain easements are extensions of the City of Madison stormwater drainage system and are the responsibility of the City. Drainage swales, detention and retention ponds, and post-construction stormwater quality measures shall be the responsibility of the owner or homeowner association. In the event the business owner or the Association fails to exercise its obligation, the City of Madison may perform the required maintenance and shall have the right to assess each lot in the subdivision a proportionate amount of the associated costs. If necessary, a Notice of Lien shall be filed against the affected lots. The lien shall be enforced in the same manner as a mortgage lien under Indiana law and, therefore, shall include reimbursement of attorney's fees, title expenses, interest, and costs of collection.*"

Chapter Two

METHODOLOGY FOR DETERMINATION OF RUNOFF RATES

Runoff rates shall be computed for the area of the parcel under development plus the area of the watershed flowing into the parcel under development. The rate of runoff which is generated as the result of a given rainfall intensity may be calculated as follows:

A. Development Sites Less than or Equal to 5 Acres in Size, With a Contributing Drainage Area Less than or Equal to 25 Acres and No Depressional Storage

The Rational Method may be used. A computer model, such as TR-55 (NRCS), TR-20 (NRCS), HEC-HMS (COE), and HEC-1 (COE), that can generate hydrographs based on the NRCS TR-55 Time-of-Concentration (T_c) and Curve Number (CN) calculation methodologies may also be used along with a 24-hour duration NRCS Type 2 storm.

During construction activities, the upper soil layers are significantly disturbed and will not exhibit the same characteristics and functions as undisturbed soils. Therefore, when determining the post-developed condition CN's, the Hydrologic Soil Group (HSG) classification should be changed to the next less infiltrating HSG that was provided for the pre-development condition. (i.e., A to B, B to C, and C to D).

In the Rational Method, the peak rate of runoff, Q, in cubic feet per second (cfs) is computed as:

$$\mathbf{Q = CIA}$$

Where: C = Runoff coefficient, representing the characteristics of the drainage area and defined as the ratio of runoff to rainfall.

I = Average intensity of rainfall in inches per hour for a duration equal to the time of concentration (t_c) for a selected rainfall frequency.

A = Tributary drainage area in acres.

Values for the runoff coefficient "C" are provided in **Tables 2-1** and **2-2**, which show values for different types of surfaces and local soil characteristics. The composite "C" value used for a given drainage area with various surface types shall be the weighted average value for the total area calculated from a breakdown of individual areas having

different surface types. **Table 2-3** provides runoff coefficients and inlet times for different land use classifications.

Rainfall intensity shall be determined from the rainfall frequency data shown in **Table 2-4**.

In general, the T_c methodology to be used for all stormwater management projects within the City shall be as outlined in the U.S. Department of Agriculture (USDA) - NRCS TR-55 Manual. In urban or developed areas, the methodology to be used shall be the sum of the inlet time and flow time in the stormwater facility from the most remote part of the drainage area to the point under consideration. The flow time in the storm sewers may be estimated by the distance in feet divided by velocity of flow in feet per second. The velocity shall be determined by the Manning's Equation (see Chapter 4). Inlet time is the combined time required for the runoff to reach the inlet of the storm sewer. It includes overland flow time and flow time through established surface drainage channels such as swales, ditches, and sheet flow across such areas as lawns, fields, and other graded surfaces.

TABLE 2-1

Urban Runoff Coefficients				
Type of Surface	*Runoff Coefficient "C" (by Storm Recurrence Interval)*			
	< 25 year	*25 year*	*50 year*	*100 year*
◆ **Hard Surfaces**				
Asphalt	0.82	0.90	1.00	1.00
Concrete	0.85	0.94	1.00	1.00
Roof	0.85	0.94	1.00	1.00
Gravel Areas	0.85	0.94	1.00	1.00
◆ **Lawns** (Sandy)				
Flat (0-2% Slope)	0.07	0.08	0.09	0.12
Rolling (2-7% Slope)	0.12	0.13	0.16	0.20
Steep (Greater than 7% Slope)	0.17	0.19	0.22	0.28
◆ **Lawns** (Clay)				
Flat (0-2% Slope)	0.16	0.18	0.21	0.26
Rolling (2-7% Slope)	0.21	0.23	0.28	0.35
Steep (Greater than 7% Slope)	0.30	0.33	0.40	0.50

Source: HERPICC Stormwater Drainage Manual, July 1995.

TABLE 2-2

Rural Runoff Coefficients				
Type of Surface	*Runoff Coefficient "C" (by Storm Recurrence Interval)*			
	< 25 year	*25 year*	*50 year*	*100 year*
◆ **Woodland** (Sandy)				
Flat (0-2% Slope)	0.10	0.11	0.13	0.17
Rolling (2-7% Slope)	0.25	0.28	0.33	0.41
Steep (Greater than 7% Slope)	0.30	0.33	0.40	0.50
◆ **Woodland** (Clay)				
Flat (0-2% Slope)	0.30	0.33	0.40	0.50
Rolling (2-7% Slope)	0.35	0.39	0.46	0.58
Steep (Greater than 7% Slope)	0.50	0.55	0.66	0.83
◆ **Pasture** (Sandy)				
Flat (0-2% Slope)	0.10	0.11	0.13	0.17
Rolling (2-7% Slope)	0.16	0.18	0.21	0.26
Steep (Greater than 7% Slope)	0.22	0.24	0.29	0.36
◆ **Pasture** (Clay)				
Flat (0-2% Slope)	0.30	0.33	0.40	0.50
Rolling (2-7% Slope)	0.36	0.40	0.48	0.59
Steep (Greater than 7% Slope)	0.42	0.46	0.55	0.69
◆ **Cultivated** (Sandy)				
Flat (0-2% Slope)	0.30	0.33	0.40	0.50
Rolling (2-7% Slope)	0.40	0.44	0.53	0.66
Steep (Greater than 7% Slope)	0.52	0.57	0.69	0.86
◆ **Cultivated** (Clay)				
Flat (0-2% Slope)	0.50	0.55	0.66	0.83
Rolling (2-7% Slope)	0.60	0.66	0.79	0.99
Steep (Greater than 7% Slope)	0.72	0.79	0.95	1.00

Source: HERPICC Stormwater Drainage Manual, July 1995.

TABLE 2-3

Runoff Coefficients by Land Use, Typical Inlet Times, and Storm Recurrence Interval													
Land Use	*Runoff Coefficients "C" (by Storm Recurrence Interval)*												*Inlet Time (Minutes) (4)*
	Flat (1)				Rolling (2)				Steep (3)				
	< 25 year	*25 year*	*50 year*	*100 year*	*< 25 year*	*25 year*	*50 year*	*100 year*	*< 25 year*	*25 year*	*50 year*	*100 year*	
Commercial *(CBD)*	0.75	0.83	0.99	1.00	0.83	0.91	1.00	1.00	0.91	1.00	1.00	1.00	5
Commercial *(Neighborhood)*	0.54	0.59	0.71	0.89	0.60	0.66	0.79	0.99	0.66	0.73	0.87	1.00	5 - 10
Industrial	0.63	0.69	0.83	1.00	0.70	0.77	0.92	1.00	0.77	0.85	1.00	1.00	
Garden Apartments	0.54	0.59	0.71	0.89	0.60	0.66	0.79	0.99	0.66	0.73	0.87	1.00	
Churches	0.54	0.59	0.71	0.89	0.60	0.66	0.79	0.99	0.66	0.73	0.87	1.00	
Schools	0.31	0.34	0.41	0.51	0.35	0.39	0.46	0.58	0.39	0.43	0.51	0.64	10 - 15
Semi Detached Residential	0.45	0.50	0.59	0.74	0.50	0.55	0.66	0.83	0.55	0.61	0.73	0.91	
Detached Residential	0.40	0.44	0.53	0.66	0.45	0.50	0.59	0.74	0.50	0.55	0.66	0.83	
Quarter Acre Lots	0.36	0.40	0.48	0.59	0.40	0.44	0.53	0.66	0.44	0.48	0.58	0.73	
Half Acre Lots	0.31	0.34	0.41	0.51	0.35	0.39	0.46	0.58	0.39	0.43	0.51	0.64	
Parkland	0.18	0.20	0.24	0.30	0.20	0.22	0.26	0.33	0.22	0.24	0.29	0.36	To be Computed

Source: HERPICC Stormwater Drainage Manual, July 1995.

(1) Flat terrain involves slopes of 0-2%.
(2) Rolling terrain involves slopes of 2-7%.
(3) Steep terrain involves slopes greater than 7%.
(4) Interpolation, extrapolation and adjustment for local conditions shall be based on engineering experience and judgment.

B. Development Sites Greater Than 5 Acres in Size or Contributing Drainage Area Greater than 25 Acres or With Significant Depressional Storage

The runoff rate for these development sites and contributing drainage areas shall be determined by a computer model that can generate hydrographs based on the NRCS TR-55 Time-of-Concentration (T_c) and Curve Number (CN) calculation methodologies.

During construction activities, the upper soil layers are significantly disturbed and will not exhibit the same characteristics and functions as undisturbed soils. Therefore, when determining the post-developed condition CN's, the Hydrologic Soil Group (HSG) classification should be changed to the next less infiltrating HSG that was provided for the pre-development condition. (i.e., A to B, B to C, and C to D).

The 24-hour NRCS Type 2 Rainfall Distribution shall be utilized for runoff calculations. 24-hour Rainfall depth for various frequencies shall be taken from **Table 2-5**. The NRCS Type 2 distribution ordinates are found in **Table 2-6**. Examples of computer models that can generate such hydrographs include TR-55 (NRCS), TR-20 (NRCS), HEC-HMS (COE), and HEC-1 (COE). These programs may be downloaded free of charge from the associated agencies' web sites. Other models may be acceptable and should be accepted by the City prior to their utilization.

TABLE 2-4

Rainfall Intensities for Various Return Periods and Storm Durations						
Intensity (Inches/Hour)						
Duration	*Return Period (Years)*					
	2	5	10	25	50	100
5 min	5.46	6.46	7.25	8.26	9.02	9.76
10 min	4.26	5.02	5.59	6.31	6.83	7.34
15 min	3.47	4.11	4.59	5.20	5.64	6.08
30 min	2.32	2.81	3.19	3.67	4.03	4.39
60 min	1.43	1.76	2.03	2.38	2.66	2.94
2 hour	0.844	1.05	1.22	1.44	1.63	1.82
3 hour	0.605	0.753	0.875	1.04	1.18	1.33
6 hour	0.371	0.461	0.535	0.640	0.728	0.820
12 hour	0.219	0.271	0.312	0.371	0.419	0.470
24 hour	0.132	0.162	0.186	0.219	0.246	0.274

Source: NOAA, National Weather Service, "Precipitation-Frequency Atlas of the United States", NOAA Atlas 14, Volume 2, Version 3, 2006, for Madison, Indiana. (partial duration series, values for intermediate durations can be logarithmically interpolated.)

TABLE 2-5

	Rainfall Depths for Various Return Periods						
	Depth (Inches)						
Duration	*Return Period (Years)*						
	1	2	5	10	25	50	100
24 Hrs.	2.64	3.17	3.90	4.48	5.28	5.92	6.59

Source: NOAA, National Weather Service, "Precipitation-Frequency Atlas of the United States", NOAA Atlas 14, Volume 2, Version 3, 2006, for Madison, Indiana (partial duration series).

TABLE 2-6

NRCS Type II Rainfall Distribution Ordinates					
Cumulative Storm Time (hr)	*Cumulative Percent of Storm Depth*	*Cumulative Storm Time (hr)*	*Cumulative Percent of Storm Depth*	*Cumulative Storm Time (hr)*	*Cumulative Percent of Storm Depth*
0.00	0	8.25	12.6	16.50	89.3
0.25	0.2	8.50	13.3	16.75	89.8
0.50	0.5	8.75	14	17.00	90.3
0.75	0.8	9.00	14.7	17.25	90.8
1.00	1.1	9.25	15.5	17.50	91.3
1.25	1.4	9.50	16.3	17.75	91.8
1.50	1.7	9.75	17.2	18.00	92.2
1.75	2	10.00	18.1	18.25	92.6
2.00	2.3	10.25	19.1	18.50	93
2.25	2.6	10.50	20.3	18.75	93.4
2.50	2.9	10.75	21.8	19.00	93.8
2.75	3.2	11.00	23.6	19.25	94.2
3.00	3.5	11.25	25.7	19.50	94.6
3.25	3.8	11.50	28.3	19.75	95
3.50	4.1	11.75	38.7	20.00	95.3
3.75	4.4	12.00	66.3	20.25	95.6
4.00	4.8	12.25	70.7	20.50	95.9
4.25	5.2	12.50	73.5	20.75	96.2
4.50	5.6	12.75	75.8	21.00	96.5
4.75	6	13.00	77.6	21.25	96.8
5.00	6.4	13.25	79.1	21.50	97.1
5.25	6.8	13.50	80.4	21.75	97.4
5.50	7.2	13.75	81.5	22.00	97.7
5.75	7.6	14.00	82.5	22.25	98
6.00	8	14.25	83.4	22.50	98.3
6.25	8.5	14.50	84.2	22.75	98.6
6.50	9	14.75	84.9	23.00	98.9
6.75	9.5	15.00	85.6	23.25	99.2
7.00	10	15.25	86.3	23.50	99.5
7.25	10.5	15.50	86.9	23.75	99.8
7.50	11	15.75	87.5	24.00	100
7.75	11.5	16.00	88.1		
8.00	12	16.25	88.7		

Source: National Resources Conservation Service (NRCS), "TR-20 Computer Program for Project Formulation Hydrology", page F9, May 1982.

NOTE: For use only when SCS Type II rainfall distribution is not a default option in the computer program.

C. Development Sites with Drainage Areas Greater than or Equal to One Square Mile

For the design of any major drainage system, as defined in **Appendix A**, the discharge must be obtained from, or be accepted by, the IDNR. Other portions of the site must use the discharge methodology in the applicable section of this Article.

Chapter Three

METHODOLOGY FOR DETERMINATION OF DETENTION STORAGE VOLUMES

The required volume of stormwater storage for all development sites shall be computed using a computer model that can generate hydrographs based on the NRCS TR-55 time of concentration and curve number calculation methodologies. Examples of computer models that can generate such hydrographs include TR-55 (NRCS), TR-20 (NRCS), HEC-HMS (COE), and HEC-1 (COE). Other models may be acceptable and should be reviewed and approved by the City prior to their utilization.

A. Post-Development Hydrologic Parameters

During construction activities, the upper soil layers are significantly disturbed and will not exhibit the same characteristics and functions as undisturbed soils. Therefore, when determining the post-developed condition CN's, the Hydrologic Soil Group (HSG) classification should be changed to the next less infiltrating HSG that was determined for the pre-development condition. (i.e., A to B, B to C, and C to D).

B. Design Storm & Allowable Release Rates for Development Sites with On-site Detention Facilities

The 24-hour NRCS Type 2 Rainfall Distribution shall be utilized to determine the required storage volume. The allowable release rates shall be determined based on methodologies provided in Chapter 6 of this Technical Standards document.

Chapter Four

STORM SEWER DESIGN STANDARDS AND SPECIFICATIONS

All storm sewers, whether private or public, and whether constructed on private or public property shall conform to the design standards and other requirements contained herein.

A. Design Storm Frequencies

1. All storm sewers, inlets, catch basins, and street gutters shall accommodate (subject to the "allowable spread" provisions discussed later in this Section), at a minimum, peak runoff from a 10-year return frequency storm calculated based on methodology described in Chapter 2. Additional discharges to storm sewer systems allowed in Section L below of this Section must be considered in all design calculations. For Rational Method analysis, the duration shall be equal to the time of concentration for the drainage area. In computer based analysis, the duration is as noted in the applicable methodology associated with the computer program.

2. Culvert capacities for conveyance under roadways shall be as follows:

Local	25-year Frequency Storm Discharge
Collector	50-year Frequency Storm Discharge
Arterial	100-year Frequency Storm Discharge

The discharges should represent runoff from off-site areas under existing condition and on-site areas under post-developed conditions. Driveway culvert capacities shall be capacities required for the street classification to which the driveway connects. Greater culvert capacity shall be required to protect the finished floor elevation of buildings from the post-developed 100-year frequency storm when, in the opinion of the design engineer or the City, the finished floor elevation is threatened. If the street or road provides the only access to or from any portion of any commercial or residential development, the crossing shall be designed for a minimum of 100-year frequency storm.

3. To ensure access to buildings and allow the use of the roadway by emergency vehicles during storms larger than the design storm, an overflow channel/swale between sag inlets and overflow paths or basin shall be provided at sag inlets so that the maximum depth of water that might be ponded in the street sag shall not exceed 7 inches measured from elevation of gutter. All water shall be contained in the right-of-way for a 100-year storm.

4. Facilities functioning as a major drainage system as defined in **Appendix A** must also meet IDNR design standards in addition to the City of Madison standards. In case of discrepancy, the most restrictive requirements shall apply.

B. Manning's Equation

Determination of hydraulic capacity for storm sewers sized by the

Rational Method analysis must be done using Manning's Equation.

Where:

$$V = (1.486/n)(R^{2/3})(S^{1/2})$$

Then:

$$Q=(V)(A)$$

Where:

Q = capacity in cubic feet per second

V = mean velocity of flow in feet per second

A = cross sectional area in square feet

R = hydraulic radius in feet

S = slope of the energy grade line in feet per foot

n = Manning's "n" or roughness coefficient

The hydraulic radius, R, is defined as the cross sectional area of flow divided by the wetted flow surface or wetted perimeter. Allowable "n" values and maximum permissible velocities for storm sewer materials are listed in **Table 4-1**.

TABLE 4-1

Typical Values of Manning's "n"		
Material	*Manning's "n"*	*Maximum Velocities (feet/second)*
◆ **Closed Conduits**		
Concrete	0.013	10
Vitrified Clay	0.013	10
HDPE	0.012	10
PVC	0.011	10
◆ **Circular CMP, Annular Corrugations, 2 2/3 x ½ inch**		
Unpaved	0.024	7
25% Paved	0.021	7
50% Paved	0.018	7
100% Paved	0.013	7
Concrete Culverts	0.013	10
HDPE or PVC	0.012	10
◆ **Open Channels**		
Concrete, Trowel Finish	0.013	10
Concrete, Broom Finish	0.015	10
Gunite	0.018	10
Riprap Placed	0.030	10
Riprap Dumped	0.035	10
Gabion	0.028	10
New Earth **(1)**	0.025	4
Existing Earth **(2)**	0.030	4
Dense Growth of Weeds	0.040	4
Dense Weeds and Brush	0.040	4
Swale with Grass	0.035	4

Source of manning "n" values: HERPICC Stormwater Drainage Manual, July 1995.

(1) New earth (uniform, sodded, clay soil)
(2) Existing earth (fairly uniform, with some weeds).

C. Backwater Method for Pipe System Analysis

For hydraulic analysis of existing or proposed storm drains which possess submerged outfalls, a more sophisticated design/analysis methodology than Manning's equation will be required. The backwater analysis method provides a more accurate estimate of pipe flow by calculating individual head losses in pipe systems that are surcharged and/or have submerged outlets. These head losses are added to a known downstream water surface elevation to give a design water surface elevation for a given flow at the desired upstream location. Total head losses may be determined as follows:

Total head loss = frictional loss + manhole loss + velocity head loss + junction loss

Various computer modeling programs such as HYDRA, ILLUDRAIN, and STORMCAD are available for analysis of storm drains under these conditions. Computer models to be utilized, other than those listed, must be accepted by the City prior to their utilization.

D. Minimum Size for Storm Sewers

The minimum diameter of all storm sewers shall be 12 inches. When the minimum 12-inch diameter pipe will not limit the rate of release to the required amount, the rate of release for detention storage shall be controlled by an orifice plate or other device, or reduced pipe size subject to acceptance of the City.

E. Pipe Cover, Grade, and Separation from Sanitary Sewers

Pipe grade shall be such that, in general, a minimum of 1.5 feet of cover is maintained over the top of the pipe. Uniform slopes shall be maintained between inlets, manholes and inlets to manholes. Final grade shall be set with full consideration of the capacity required, sedimentation problems, and other design parameters. Minimum and maximum allowable slopes shall be those capable of producing velocities of between 2.0 and 15 feet per second, respectively, when the sewer is flowing full. Maximum permissible velocities for various storm sewer materials are listed in **Table 4-1**. A minimum of 2.0 feet of vertical separation between storm sewers and sanitary sewers shall be required. When this is not possible, the sanitary sewer must be encased in concrete or ductile steel within 5 feet, each side, of the crossing centerline.

F. Alignment

Storm sewers shall be straight between manholes and/or inlets.

G. Manholes/Inlets

All castings (Inlets and Manholes) must be pre-stamped (embossed) with an appropriate "clean water" message; for example, "Dump No Waste, Drains to Stream". Manholes and/or inlets shall be installed to provide human access to continuous underground storm sewers for the purpose of inspection and maintenance. The casting access minimum inside diameter shall be no less than 22 inches or a rectangular opening of no less than 22 inches by 22 inches. Steps shall be provided in structures deeper than 4 feet, with the first step at the depth of 2 feet and the following steps spaced every 1 foot until the bottom is reached. When grade adjustments of manholes and inlets are required in the field to meet finish design or existing curb grade, adjustment rings with a maximum height of 12 inches may be used. Manholes shall be provided at the following locations:

1. Where two or more storm sewers converge.
2. Where pipe size or the pipe material changes.
3. Where a change in horizontal alignment occurs.
4. Where a change in pipe slope occurs.
5. At intervals in straight sections of sewer, not to exceed the maximum allowed. The maximum distance between storm sewer manholes shall be as shown in **Table 4-2**.

TABLE 4-2

Maximum Distance Between Manholes or Inlets	
Size of Pipe (Inches)	**Maximum Distance (Feet)**
12 through 42	400
48 and larger	500

When changing pipe size, match inverts of pipes, unless detailed modeling of hydraulic grade line shows that another arrangement would be as effective. Pipe slope should not be so steep that inlets surcharge, i.e., hydraulic grade line should remain below rim elevation for storm event discharges up to and including the 100-year storm event.

All connections to storm sewer structures shall be core-drilled and properly sealed. No direct connections or "blind taps" shall be made to storm pipes.

Manhole/inlet inside sizing shall be as shown in **Table 4-3**.

TABLE 4-3

Manhole/Inlet Inside Sizing		
Depth of Structure	**Minimum Diameter**	**Minimum Square Opening**
Less than 5 feet	36 inches	36" x 36"
5 feet or more	48 inches	48" x 48"

H. Inlet Sizing and Spacing

Inlets or drainage structures shall be utilized to collect surface water through grated openings and convey it to storm sewers, channels, or culverts. The inlet grate opening provided shall be adequate to pass the design 10-year flow with 50% of the sag inlet areas clogged. Inlets shall be provided so that surface water is not carried across or around any intersection nor for a distance greater than three-hundred (300) feet. An overflow channel from sag inlets to the overflow channel or basin shall be provided at sag inlets. Inlet design and spacing may be done using the hydraulic equations by manufacturers or orifice/weir equations. Use of the U.S. Army Corps of Engineers HEC-12 computer program is also an acceptable method. Gutter spread on continuous grades may be determined using the Manning's equation. Further guidance regarding gutter spread calculation may be found in the latest edition of the Indiana LTAP Stormwater Drainage Manual, available from the Local Technical Assistance Program (LTAP). At the time of printing of this document, contact information for LTAP was:

Indiana LTAP
Purdue University
Toll-Free: (800) 428-7369 (Indiana only)
Phone: (765) 494-2164
Fax: (765) 496-1176
Email: inltap@ecn.purdue.edu
Website: www.purdue.edu/INLTAP

I. Installation and Workmanship

The point of commencement for laying a storm sewer pipe shall be the lowest point in the proposed sewer line. All pipes shall be laid, without break, upgrade from structure to structure. All storm sewer pipe outlets shall have poured in place toe-walls with anchor bolts. The specifications for the construction of storm sewers and sub-drains, including backfill requirements, shall not be less stringent than those set forth in the latest edition of the INDOT, "Standard Specifications".

J. Materials

Storm sewer manholes and inlets shall be constructed of cast in place concrete or pre-cast reinforced concrete. All subsurface drains, including swale underdrains, curb underdrains, etc. shall be smooth double-wall pipe. Material and construction shall conform to the latest edition of the Indiana Department of Transportation (INDOT) "Standard Specifications".

Pipe and fittings used in storm sewer construction shall comply with the latest edition of the INDOT "Standard Specifications." Pipe joints shall be flexible and watertight and shall conform to the requirements of Section 906, of the latest edition of the INDOT "Standard Specifications".

K. Special Hydraulic Structures

Special hydraulic structures required to control the flow of water in storm runoff drainage systems include junction chambers, drop manholes, stilling basins, and other special structures. The use of these structures shall be limited to those locations justified by prudent planning and by careful and thorough hydraulic engineering analysis. Certification of special structures by a certified Structural Engineer may also be required.

L. Connections to Storm Sewer System

To allow any connections to the storm sewer system, provisions for the connections shall be shown in the drainage calculations for the system. Specific language shall be provided in the protective covenants, on the record plat, or with the parcel deed of record, noting the ability or inability of the system to accommodate any permitted connections.

1. **Sump pumps** shall not be connected to the storm sewer system**.** Grinder pumps installed to receive and discharge floor drain flow or other sanitary sewage shall be connected to the sanitary sewers.

2. **Footing drains and perimeter drains** shall not be connected to the storm sewer system.

3. All **roof downspouts**, roof drains, or roof drainage piping shall discharge onto the ground and shall not be directly connected to the storm drainage system or the sanitary sewer system.

4. **Swimming Pool drains** shall not be connected to the storm sewer system.

5. **Garage and Basement floor drains** shall not be connected to the storm sewers. These drains shall be routed to the sanitary sewers.

In addition, none of the above mentioned devices shall be connected to any street underdrains, unless requested as a variance and specifically authorized by the City.

M. Drainage System Overflow Design

Overflow path/ponding areas throughout the development resulting from a 100-year storm event, calculated based on all contributing drainage areas, on-site and off-site, in their proposed or reasonably anticipated land use and with storm pipe system assumed completely plugged, shall be determined. The centerline of this 100-year overflow path shall be clearly shown as a distinctive line symbol on the plans, and a minimum width of 30 feet flow width along the centerline of the flow path (15 feet from centerline on each side) designated as permanent DE. A continuous flood route from the sag inlets to the final outfall shall be shown and the minimum 30-feet along the centerline contained within an easement or road right-of-way regardless of the 100-year storm event ponding elevation. There shall be no trees or shrubs planted, nor any structures or fences erected within the easement areas.

All buildings shall have a minimum flood protection grade shown on the secondary plat. Minimum Flood Protection Grade of all structures fronting a pond or open ditch shall be no less than 2 feet (1 foot for the 100-year overflow path as the storm drains are assumed plugged as an additional safety factor) above any adjacent 100-year local or regional flood elevations, whichever is greater, for all windows, doors, attached garage entrances, unsealed pipe entrances, window well rim elevations, and any other structure member where floodwaters can enter a building.

The overflow path/ponding may be modeled as successive series of natural ponds and open channel segments. Ponds should be modeled similar to that discussed for modeling depressional areas in Chapter 6. Channels should be modeled according to modeling techniques discussed in Chapter 5. The calculations for determining the 100-year overflow path/ponding elevations may be based on hand calculation methods utilizing normal depth calculations and storage routing techniques or performed by computer models. Examples of computer models that either individually or in combination with other models can handle the required computations include TR-20, HEC-HMS, and HEC-1, combined with HEC-RAS. Other models may be acceptable but should be accepted by the City **prior** to their utilization.

The LAG requirements for buildings adjacent to other flooding sources are discussed elsewhere in the Ordinance or in this Manual. In case there are more than one flooding sources applicable to a building site, the highest calculated LAG for the building shall govern the placement of the building on that site.

In the case of existing upstream detention, an allowance equivalent to the reduction in flow rate provided may be made for upstream detention only when: (1) such detention and release rate have previously been accepted by the City or the official charged with the approval authority at the time of the acceptance, and (2) evidence of its construction and maintenance can be shown.

Chapter Five

OPEN CHANNEL DESIGN STANDARDS AND SPECIFICATIONS

All channels, whether private or public, and whether constructed on private or public land, shall conform to the design standards and other design requirements contained herein.

A. Design Storm Frequencies

1. All channels and swales shall accommodate, as a minimum, peak runoff from a 24-hour, 10-year return frequency storm calculated based on methodology described in Chapter 2. For Rational Method analysis, the storm duration shall be equal to the time of concentration for the drainage area. In computer-based analysis, the duration is as noted in the applicable methodology associated with the computer program.

2. Channels with a carrying capacity of more than 30 cfs at bank-full stage shall be capable of accommodating peak runoff for a 24-hour, 50-year return frequency storm within the drainage easement.

3. Channel facilities functioning as a major drainage system, as defined in **Appendix A**, must also meet IDNR design standards in addition to the City standards. In case of discrepancy, the most restrictive requirements shall apply.

4. Regardless of minimum design frequencies stated above, the performance of all parts of drainage system shall be checked for the 100-year flow conditions to insure that all buildings are properly located outside the 100-year flood boundary and that flow paths are confined to designated areas with sufficient easement.

B. Manning's Equation

The waterway area for channels shall be determined using Manning's Equation, where:

$$A = Q/V$$

A = Waterway area of channel in square feet

Q = Discharge in cubic feet per second (cfs)

V = Steady-State channel velocity, as defined by Manning's Equation (See Chapter 4)

C. Backwater Method for Drainage System Analysis

The determination of 100-year water surface elevation along channels and swales shall be based on accepted methodology and computer programs designed for this purpose. Computer programs HEC-RAS, HEC-2, and ICPR are preferred programs for conducting such backwater analysis. The use of other computer models must be accepted in advance by the City.

D. Channel Cross-Section and Grade

1. The required channel cross-section and grade are determined by the design capacity, the material in which the channel is to be constructed, and the requirements for maintenance. A minimum depth may be required to provide adequate outlets for subsurface drains, tributary ditches, or streams. The channel grade shall be such that the velocity in the channel is high enough to prevent siltation but low enough to prevent erosion. Velocities less than 2 feet per second are not acceptable, as siltation will take place and ultimately reduce the channel cross-section area. The maximum permissible velocities in vegetated-lined channels are shown in **Table 5-1.** In addition to existing runoff, the channel design should incorporate increased runoff due to the proposed development.

2. Where depth of design flow is slightly below critical depth, channels shall have freeboard adequate to cope with the effect of hydraulic jumps.

3. Along the streets and roads, the bottom of the ditch should be low enough to install adequately sized driveway culverts without creating "speed bumps". The driveway culvert inverts shall be designed to adequately consider upstream and downstream culvert elevations.

4. Minimum longitudinal slope for a grass swale is 1.5% and all side slope must be 3:1 or flatter. All swales/channels with a longitudinal slope of less than 1.5% will receive a concrete invert with a depth needed to contain a 2-year return interval event.

TABLE 5-1

Maximum Permissible Velocities in Grass-Lined Channels (1)			
Cover	*Channel Slope Range (Percent)* **(3)**	*Permissible Velocity* **(2)**	
		Erosion Resistant Soils (ft. per sec.) **(4)**	*Easily Eroded Soils (ft. per sec.)* **(4)**
Bermuda Grass	0-5 5-10 Over 10	8 7 6	6 5 4
Bahia Buffalo Grass Kentucky Bluegrass Smooth Brome Blue Grama	0-5 5-10 Over 10	7 6 5	5 4 3
Grass Mixture Reed Canary Grass	**(3)** 0-5 5-10	5 4	4 3
Lespedeza Sericea Weeping Lovegrass Yellow Bluestem Redtop Alfalfa Red Fescue	**(4)** 0-5 5-10	3.4	2.5
Common Lespedeza **(5)** Sudangrass **(5)**	**(6)** 0-5	3.5	2.5

(1) From Soil Conservation Service, SCS-TP-61, "Handbook of Channel Design for Soil and Water Conservation".

(2) Use velocities exceeding 5 feet per second only where good channel ground covers and proper maintenance can be obtained.

(3) Do not use on slopes steeper than 10 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.

(4) Do not use on slopes steeper than 5 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.

(5) Annuals - use on mild slopes or as temporary protection until permanent covers are established.

(6) Use on slopes steeper than 5 percent is not recommended.

E. Side Slopes

1. Earthen channel and swale side slopes shall be no steeper than 3 horizontal to 1 vertical (3:1).

2. Where channels will be lined with riprap, concrete, or other acceptable lining method, side slopes shall be no steeper than 2 horizontal to 1 vertical (2:1) with adequate provisions made for weep holes.

3. Side slopes steeper than 2 horizontal to 1 vertical (2:1) may be used for lined channels provided that the side lining is designed and constructed as a structural retaining wall with provisions for live and dead load surcharge.

4. When the design discharge produces a depth of greater than three (3) feet in the channel, appropriate safety precautions shall be added to the design criteria based on reasonably anticipated safety needs.

F. Channel Stability

1. Characteristics of a stable channel are:

   a) It neither promotes sedimentation nor degrades the channel bottom and sides.

   b) The channel banks do not erode to the extent that the channel cross-section is changed appreciably.

   c) Excessive sediment bars do not develop.

   d) Excessive erosion does not occur around culverts, bridges, outfalls or elsewhere.

   e) Gullies do not form or enlarge due to the entry of uncontrolled flow to the channel.

G. Drainage Swales

Minimum longitudinal slopes for concrete swales is 0.5% and minimum slope for grass swlaes is 1.5%. All flow shall be confined to the specific easements associated with each rear and side lot swale that are part of the minor drainage system. Unless designed to act as a stormwater quality BMP, vegetated swales shall have 6-inch sub-surface drain with a minimum cover of 2 feet to dry the swales.

J. Materials

Materials acceptable for use as channel lining are:

1. Grass
2. Revetment Riprap
3. Concrete
4. Hand Laid Riprap
5. Precast Cement Concrete Riprap
6. Gabions
7. Straw or Coconut Mattings (only until grass is established)

Other lining materials must be accepted in writing by the City. Materials shall comply with the latest edition of the INDOT, "Standard Specifications".

K. Drainage System Overflow Design

See Chapter 4, Section M.

Chapter Six

STORMWATER DETENTION DESIGN STANDARDS FOR PEAK FLOW CONTROL

Basins shall be constructed to temporarily detain the stormwater runoff that exceeds the maximum peak release rate authorized by the Ordinance or these Technical Standards. The required volume of storage provided in these basins, together with such storage as may be authorized in other on-site facilities, shall be sufficient to control excess runoff from the 2-year, 10-year or 100-year storm as explained below in Section "B.". Also, basins shall be constructed to provide adequate capacity to allow for sediment accumulation resulting from development and to permit the pond to function for reasonable periods between cleanings.

The following shall govern the design of any improvement with respect to the detention of stormwater runoff for peak flow control.

A. Acceptable Detention Facilities

The increased stormwater runoff resulting from a proposed development should be detained on-site by the provisions of appropriate above- or below-ground wet bottom or dry bottom detention facilities, parking lots, or other acceptable techniques. Measures that retard the rate of overland flow and the velocity in runoff channels shall also be used to partially control runoff rates.

B. Allowable Release Rates

1. General Release Rates

Control devices shall limit the discharge such that the post-developed release rate from the site is no greater than the pre-developed release rate for the 2, 10, 100-year storm events.

These release rates may be set at a different value by the City if more detailed data becomes available as a result of comprehensive watershed studies conducted and/or formally approved and adopted by the City of Madison. The applicant shall confirm the applicable release rates with the City prior to initiating the design calculations to determine whether a basin-specific rate has been established for the watershed.

For sites where the pre-developed area has more than one (1) outlet, the release rate should be computed based on pre-developed discharge to each outlet point. The computed release rate for each outlet point shall not be exceeded at the respective outlet point even if the post developed conditions would involve a different arrangement of outlet points.

2. Site-Specific Release Rates for Sites with Depressional Storage

The City of Madison does not allow depressional storage to be used in calculations to alter the amount of Pre-Development or Post-Development Discharges.

3. Management of Off-site Runoff

Runoff from all upstream tributary areas (off-site land areas) may be bypassed around the detention/retention facility without attenuation. Such runoff may also be routed through the detention/retention facility, provided that a separate outlet system or channel is incorporated for the safe passage of such flows, i.e., not through the primary outlet of a detention facility. Unless the pond is being designed as a regional detention facility and therefore all off-site runoff to the pond detained, the primary outlet structure shall be sized and the invert elevation of the emergency overflow weir determined according to the on-site runoff only.

To accomplish this, the 100-year on-site runoff must be determined by temporarily ignoring the off-site runoff and routing it through the pond and through the primary outlet pipe. The resulting pond elevation would be the invert elevation of the emergency overflow weir. Once the size and location of primary outlet structure and the invert elevation of the emergency overflow weir are determined by considering on-site runoff, the 100-year pond elevation is determined by routing the entire inflow, on-site and off-site, through the pond. Note that the total peak flow released from the outlet system shall not be larger than the total of the allowable release rate and the off-site flow being bypassed through the pond for the 100-year event. A separate emergency overflow spillway would then need to be placed at the 100-year pond elevation and the top of the dam elevation shall be constructed with a minimum freeboard of 2 feet.

Note that the efficiency of the detention/retention facility in controlling the on-site runoff may be severely affected if the off-site area is considerably larger than the on-site area. As a general guidance, on-line detention may not be effective in controlling on-site runoff where the ratio of off-site area to on-site area is larger than 5:1. Additional detention (above and beyond that required for on-site area) may be required by the City when the ratio of off-site area to on-site area is larger than 5:1.

4. Downstream Restrictions

In the event the downstream receiving channel or storm sewer system is inadequate to accommodate the post-developed release rate provided above, then the allowable release rate shall be reduced to that rate permitted by the capacity of the receiving downstream channel or storm sewer system. Additional detention, as determined by the City, shall be required to store that portion of the runoff exceeding the capacity of the receiving sewers or waterways. When such downstream restrictions are suspected, the City may

require additional analysis to determine the receiving system's limiting downstream capacity.

If the proposed development makes up only a portion of the undeveloped watershed upstream of the limiting restriction, the allowable release rate for the development shall be in direct proportion to the ratio of its drainage area to the drainage area of the entire watershed upstream of the restriction.

As an alternative to reduction of release rates, the City may require the applicant to pursue alleviating downstream restrictions. The applicant would be responsible for obtaining all permits and consents required and for incurring all expenses involved in such undertaking.

C. General Detention Basin Design Requirements

1. The design shall ensure that a minimum 90% of the original detention capacity is restored within 48 hours from the end of the design 100-year storm.

2. The 100-year elevation of stormwater detention facilities shall be horizontally separated by not less than 25 feet from any building or structure to be occupied. The top of bank for all detention facilities shall be at least two (feet) above the 100-year pond elevation (except for emergency spillway); this is commonly referred to as "freeboard". The Lowest Adjacent Grade (including walkout basement floor elevation) for all residential, commercial, or industrial buildings shall be set a minimum of 2 feet above the 100-year pond elevation or 2 feet above the emergency overflow weir elevation, whichever is higher. In addition to the Lowest Adjacent Grade requirements, any basement floor must be at least a foot above the normal water level of any wet-bottom pond or the local groundwater table, whichever is higher, to avoid the overuse of sump pumps and frequent flooding of the basement.

3. Slopes no steeper than 3 horizontal to 1 vertical (3:1) for safety, erosion control, stability, and ease of maintenance shall be permitted above normal pool.

4. Storm drain pipes discharging into the pond shall not be fully submerged.

5. Outlet control structures shall be designed to operate as simply as possible and shall require little or no maintenance and/or attention for proper operation. For maintenance purposes, the outlet from the pond shall be a minimum of 0.5 foot above the normal water level of the receiving water body.

   For above ground facilities, if an outlet control structure includes an orifice to restrict the flow rate, such orifice shall be no less than 6 inches in diameter.

6. Emergency overflow facilities such as a weir or spillway shall be provided for the release of exceptional storm runoff or in emergency conditions should the normal discharge devices become totally or partially inoperative. The overflow

facility shall be of such design that its operation is automatic and does not require manual attention.

Emergency overflow facilities shall be designed to convey, without overtopping the detention facility banks, one and one-quarter (1.25) times the peak inflow discharge resulting from the 100-year design storm event runoff from the entire contributing watershed draining to the detention/retention facility, assuming post-development condition on-site and existing condition off-site. The length of the weir is to be determined using the weir equation, with the overflow weir control elevation at the pond's 100-year elevation (pond is assumed full to the overflow weir control elevation), discharge equal to 1.25 times the peak 100-year inflow, and the maximum head being the difference between the weir control elevation and the top of the bank.

The emergency overflow routing from the emergency overflow facility to an adequate receiving system must be positive (by gravity), located entirely within Common Area, and shown on the construction plans and on the plat. **No encroachments into the emergency overflow will be permitted.** It must be sized to accommodate the design flow of the pond's emergency overflow weir. Thirty (30) feet along the centerline of this emergency overflow route shall be designated as permanent drainage easement. No fences or landscaping can be constructed within the easement areas. The Lowest Adjacent Grade of all residential, commercial, or industrial buildings along this emergency overflow route shall be set a minimum of 2 feet above the flood elevation along the route, calculated based on the pond's emergency overflow weir design discharge. The Emergency overflow must be constructed with a non-eroding surface such as articulated block or approved equal. No rip rap or concrete weir shall be permitted.

7. Grass or other suitable vegetative cover shall be provided along the banks of the detention storage basin. Vegetative cover around detention facilities should be maintained as appropriate.

8. Debris and trash removal and other necessary maintenance shall be performed on a regular basis to assure continued operation in conformance to design.

9. No residential lots or any part thereof, including swales, shall be used for any part of a detention basin assumed full to the 100-year water surface elevation or the emergency overflow weir elevation, whichever is higher. Detention basins, assumed full to the 100-year water surface elevation or the emergency overflow weir elevation, whichever is higher, shall be placed within a common area either platted or legally described and recorded as a permanent drainage easement. A minimum of fifteen (15) feet horizontally from the top of bank of the facility, or the 100-year pool if no defined top of bank is present, shall be dedicated as permanent drainage easement if the above-noted boundary of the common area does not extend that far.

10. Anti-Clog Features: Detention outlet structures may require anti-clog devices acceptable to the City.

11. The detention basin shall be the first item of construction prior to any other earth moving or land disturbing activities and must be designed to function as a sediment basin through the construction period. The basin design must be checked for capacity due to additional runoff generated by disturbed site conditions. No construction trash or debris shall be allowed to be placed within the basin permanent pool. The project performance sureties will not be released until sediment has been cleaned out of the pond and elevations and grades have been reestablished as noted in the accepted plans.

D. Additional Requirements for Wet-Bottom Facility Design

Where part of a detention facility will contain a permanent pool of water, all the items required for detention storage shall apply. Also, a controlled positive outlet will be required to maintain the design water level in the wet bottom facility and provide required detention storage above the design water level. However, the following additional conditions shall apply:

1. Facilities designed with permanent pools or containing permanent lakes shall have a water area of at least one-half (0.5) acre with a minimum depth of ten (10) feet over at least 50% of pond area. The remaining pond area shall have no extensive shallow areas, except as required to install the safety ramp and safety ledge as required below. Construction trash or debris shall not be placed within the permanent pool.

2. All wet detention/retention ponds should be constructed in as natural a shape (footprint) as possible, and have a vegetated safety ledge (approximately 6 inches below normal pool) and/or have native vegetation planted on the pond banks to create a riparian buffer (minimum 10 feet wide). Native vegetation can be installed as container grown plants or as seed at the time of construction. If native vegetation is planted on the pond banks, signage must be provided indicating that it is a natural “Do Not Mow” area. If a non-vegetated safety ledge is installed, the depth of the safety ledge shall be approximately 18 inches below normal pool.
   All pond slopes above normal pool elevation shall be 3:1 (horizontal to vertical) or flatter. Pond slopes below normal pool elevation shall be constructed at a maximum slope of 2H:1V.

E. Additional Requirements for Dry-Bottom Facility Design

In addition to general design requirements, detention facilities that will not contain a permanent pool of water shall comply with the following requirements:

1. In excavated detention facilities, a minimum side slope of 3:1 shall be provided for stability. In the case of valley storage, natural slopes may be considered to be stable.

F. Detention Facilities in Floodplains

Detention facilities shall not be allowed within the 100-year floodplain.

G. Joint Development of Control Systems

Stormwater control systems may be planned and constructed jointly by two or more developers as long as compliance with the Ordinance and these Technical Standards is maintained.

H. Diffused Outlets

When the allowable runoff is released in an area that is susceptible to flooding or erosion, the developer may be required to construct appropriate storm drains through such area to avert increased flood hazard caused by the concentration of allowable runoff at one point instead of the natural overland distribution. The requirement of diffused outlet drains shall be at the discretion of the City.

I. IDNR Requirements

Any construction in the floodway of a stream with a drainage area of one square mile or more must satisfy IDNR permit requirements.

J. Allowance for Sedimentation

Basins shall be designed to collect sediment and debris in specific locations, such as a hydrodynamic separator or equivalent practice, so that removal costs are kept to a minimum. For wet-bottom ponds, the sediment allowance may be provided below the permanent pool elevation.

K. Maintenance

The routine maintenance of stormwater detention facilities (i.e. trash pickup, aeration, weed control, sediment removal etc.) is the responsibility of the business owner or the Homeowners' Association. In the event the business owner or the Association fails to exercise its obligation, the city of Madison may perform the required maintenance and shall have the right to assess each lot in the subdivision a proportionate amount of the associated costs. If necessary, a Notice of Lien shall be filed against the affected lots. The lien shall be enforced in the same manner as a mortgage lien under Indiana law and, therefore, shall include reimbursement of attorney's fees, title expenses, interest, and costs of collection.

L. Underground Detention

a. All applicable standards from Chapter Four and Six shall apply.

b. **All underground detention (including oversized piping) shall be bonded.** A construction estimate (on the construction contractor's letterhead) must be submitted by the engineer during the City of Madison review period outlining the construction cost of the underground system. This construction estimate

will serve as the required bond amount. The system shall be tele-inspected prior to bond release.

c. The maximum tributary area to one underground detention system shall be no greater than 25 acres.

d. No through drainage shall be allowed in an underground detention system. With prior approval, exceptions may be made for small amounts of offsite sheet flow.

e. The lowest floor (lowest adjacent grade (LAG)) of all adjacent buildings and equipment shall be at least one foot above the 100-year Water Surface Elevation.

f. All underground detentions systems shall be setback no less than 50' from a septic field or water well.

g. **All underground detention systems shall have a grit removal system at the basin inlet.**

h. All underground detention systems shall be of sufficient capacity to hold the 100-year storm without surcharging. If the lot size restricts the ability to size the underground detention for the 100-year storm a variance may be requested from the City of Madison.

i. All underground detention systems shall have an emergency overflow.

j. The minimum pipe size and vault height for underground storage structures shall be no less than 36".

k. **All underground detention systems shall have a Long-Term Maintenance Agreement that shall be recorded with the Deed.**

l. The design may allow 30% of void space in gravel base (pre-washed stone) to be utilized for storage volume.

m. To enable long-term inspection and maintenance of the facility, maintenance and access ports shall be located at the inlets and outlets of the facility. Additionally, at least one access port shall be provided at 100-foot intervals to each chamber, row, pipe, and separate components or for each 1000 square feet of underground facility surface area.

n. The Engineer shall provide inspection during construction and shall provide a final inspection report with construction photographs that demonstrate the facility will function as designed. Post-construction videos may be required upon request from the City of Madison. The report shall include a certification statement from the Engineer that the facility was constructed in accordance with the plans accepted by the City of Madison. The Engineer shall also provide as-built drawings of the facility.

Chapter Seven

CONSTRUCTION SITES STORMWATER POLLUTION PREVENTION STANDARDS

The requirements contained in this chapter are intended to prevent stormwater pollution resulting from soil erosion and sedimentation or from mishandling of solid and hazardous waste. Practices and measures included herein should assure that no foreign substance, (e.g. sediment, construction debris, chemicals) be transported from a site and allowed to enter any drainageway, whether intentionally or accidentally, by machinery, wind, rain, runoff, or other means.

A. POLLUTANTS OF CONCERN DURING CONSTRUCTION

The major pollutant of concern during construction is sediment. Natural erosion processes are accelerated at a project site by the construction process for a number of reasons, including the loss of surface vegetation and compaction damage to the soil structure itself, resulting in reduced infiltration and increased surface runoff. Clearing and grading operations also expose subsoils which are often poorly suited to re-establish vegetation, leading to longer-term erosion problems.

Problems associated with construction site erosion include: transport of pollutants attached to transported sediment; increased turbidity (reduced light) in receiving waters; recreational use impairment. The deposited sediment may pose direct toxicity to wildlife, or smother existing spawning areas and habitat. This siltation also reduces the capacity of waterways, resulting in increased flood hazards to the public.

Other pollutants of concern during the construction process are hazardous wastes or hydrocarbons associated with the construction equipment or processes. Examples include concrete washout, paints, solvents, and hydrocarbons from refueling operations. Poor control and handling of toxic construction materials pose an acute (short-term) or chronic (long-term) risk of death to aquatic life, wildlife, and the general public.

B. EROSION AND SEDIMENT CONTROL REQUIREMENTS

In calculating the total area of land disturbance, for the purposes of determining applicability of this section to a project, the following guidelines should be used:

1. Off-site construction activities that provide services (for example, road extensions, sewer, water, offsite stockpiles, and other utilities) to a land disturbing project site, must be considered as a part of the total land disturbance calculation for the project site, when the activity is under the control of the project site owner.

2. To determine if multi-lot project sites are regulated by this chapter, the area of land disturbance shall be calculated by adding the total area of land disturbance for improvements, such as,

roads, utilities, or common areas, and the expected total disturbance on each individual lot, as determined by the following:

i. For a single-family residential project site where the lots are one-half (0.5) acre or more, one-half (0.5) acre of land disturbance must be used as the expected lot disturbance.
ii. For a single-family residential project site where the lots are less than one half (0.5) acre in size, the total lot must be calculated as being disturbed.
iii. To calculate lot disturbance on all other types of projects sites, such as industrial and commercial projects project sites, a minimum of one (1) acre of land disturbance must be used as the expected lot disturbance, unless the lots are less than one (1) acre in size, in which case the total lot must be calculated as being disturbed.

The following principles shall govern erosion and sediment control practices on all sites:

1. Sediment-laden water flowing from the site shall be detained by erosion control measures appropriate to minimize sedimentation.

2. Water shall not be discharged in a manner that causes erosion at or downstream of the point of discharge.

3. All access to building sites that cross a natural watercourse, drainage easement, or swale/channel shall have a culvert of appropriate size.

4. Wastes or unused building materials, including but not limited to garbage, debris, cleaning wastes, wastewater, toxic materials, and hazardous substances, shall not be carried by runoff from a site. All wastes shall be disposed of in a proper manner. No construction trash or debris shall be allowed to be placed within the permanent pool of the detention/retention ponds. If the pond is used as a sediment control measure during active construction, the performance sureties will not be released until sediment has been cleaned out of the pond and elevations and grades have been reestablished as noted in the accepted plans.

5. Concrete washout material must be properly contained within an appropriate practice and any waste material properly disposed of.

6. Sediment being tracked from a site onto public or private roadways shall be minimized. This can be accomplished initially by a temporary gravel construction entrance, in addition to a well-planned layout of roads, access drives, and parking areas. Any tracking of sediment onto public roadways shall be **fully** removed utilizing appropriate methods as soon as practical, but in no case shall tracked sediment be allowed to remain on the public roadways overnight.

7. Public or private roadways shall be kept cleared of accumulated sediment. Bulk clearing of sediment shall not include flushing the area with water.

8. All storm drain inlets shall be protected against sedimentation with barriers meeting accepted criteria, standards and specifications.

9. Runoff passing through a site from adjacent areas shall be controlled by diverting it around disturbed areas, where practical. Diverted runoff shall be conveyed in a manner that will not

erode the channel and receiving areas. Alternatively, the existing channel may be left undisturbed or improved to prevent erosion or sedimentation from occurring.

10. Drainageways and swales shall be designed and adequately protected so that their final gradients and resultant velocities will not cause channel or outlet scouring.

11. All disturbed ground left inactive for seven (7) or more days shall be stabilized by seeding, sodding, mulching, covering, or by other equivalent erosion control measures. Stabilization activity must be completed within fourteen (14) days after initiation.

12. Appropriate sediment control practices shall be installed prior to any land disturbance and thereafter whenever necessary. Additional control measures may be required at the direction of the City.

13. During the period of construction activity at a site, erosion control measures necessary to meet the requirements of the Madison Stormwater Ordinance and these Technical Standards shall be maintained by the applicant.

C. COMMON CONTROL PRACTICES

All erosion control and stormwater pollution prevention measures required to comply with the Ordinance or these Technical Standards shall meet the design criteria, standards, and specifications similar to or the same as those outlined in the "Indiana Drainage Handbook" and "Indiana Storm Water Quality Manual," (ISWQM) or other comparable and reputable references. Table 7-1 lists some of the more common and effective practices for preventing stormwater pollution from construction sites. Details of each practice can be found in the Indiana Drainage Handbook, ISWQM, or in Appendix C. These practices should be used to protect ***every*** potential pollution pathway to stormwater conveyances.

Table 7-1

Common Stormwater Pollution Control Practices for Construction Sites

Practice No.	BMP Description	Applicability	Fact Sheet
1	Site Assessment	All sites	ISWQM (Ch.2)
2	Development of A Construction Sequence Schedule	All sites	ISWQM (Ch. 5)
3	Tree Preservation and Protection	Nearly all sites	ISWQM
4	Temporary Construction Ingress/Egress Pad	All sites	ISWQM
5	Wheel Wash	All sites	CN - 101
6	Silt Fence	Small drainage areas	ISWQM
7	Surface Roughening	Sites with slopes that are to be stabilized with vegetation	ISWQM
8	Temporary Seeding	Areas of bare soil where additional work is not scheduled to be performed for a minimum of 15 days	ISWQM
9	Mulching	Temporary surface stabilization	ISWQM
10	Erosion Control Blanket (Surface)	Temporary surface stabilization, anchor for mulch	ISWQM
11	Temporary Diversion	Up-slope and down-slope sides of construction site, above disturbed slopes within site	ISWQM
12	Rock Check Dam	2 acres maximum contributing drainage area	ISWQM
13	Temporary Slope Drain	Sites with cut or fill slopes	ISWQM
14	Geotextile Fabric Drop Inlet Protection	1 acre maximum contributing drainage area	ISWQM
15	Insert (Basket) Curb Inlet Protection	1 acre maximum contributing drainage area	ISWQM
16	Temporary Sediment Trap	5 acre maximum contributing drainage area	ISWQM
17	Temporary Dry Sediment Basin	30 acre maximum contributing drainage area	ISWQM
18	Dewatering Structures	Sites requiring dewatering	CN-102
19	Dust Control	All sites	ISWQM
20	Spill Prevention and Control	All sites	CN - 103
21	Solid Waste Management	All sites	CN - 104
22	Hazardous Waste Management	All sites	CN - 105

* See ISWQM Chapter 7 (2007 or latest version), unless otherwise noted. (http://www.in.gov/idem/stormwater/)

D. INDIVIDUAL LOT CONTROLS

Although isolated individual lots or individual lots within a larger development may not appear to contribute as much sediment as the overall development, the cumulative effect of lot development is of concern. From the time construction on an individual lot begins, until the individual lot is stabilized, the builder must take steps to:

- protect adjacent properties from sedimentation
- prevent mud/sediment from depositing on the street
- protect drainageways from erosion and sedimentation
- prevent sediment laden water from entering storm sewer inlets.

This can be accomplished using numerous erosion and sediment control measures. The standard plan includes perimeter silt fence, stabilized construction entrance, curb inlet protection, drop inlet protection, stockpile containment, stabilized drainage swales, downspout extensions, temporary seeding and mulching, and permanent vegetation. Every relevant measure should be installed at each individual lot site.

Construction sequence on individual lots should be as follows:

1. Clearly delineate areas of trees, shrubs, and vegetation that are to be undisturbed. To prevent root damage, the areas delineated for tree protection should be at least the same diameter as the crown.
2. Install perimeter silt fence at construction limits. Position the fence to intercept runoff prior to entering drainage swales.
3. Avoid disturbing drainage swales if vegetation is established. If drainage swales are bare, install erosion control blankets or sod to immediately stabilize.
4. Install drop inlet protection for all inlets on the property.
5. Install curb inlet protection, on both sides of the road, for all inlets along property frontage and the along the frontage of adjacent lots.
6. Install gravel construction entrance that extends from the street to the building pad.
7. Perform primary grading operations.
8. Contain erosion from any soil stockpiles created on-site with silt fence around the base.
9. Establish temporary seeding and straw mulch on disturbed areas.
10. Construct the home and install utilities.
11. Concrete washout material must be properly contained within an appropriate practice and any waste material properly disposed of.
12. Install downspout extenders once the roof and gutters have been constructed. Extenders should outlet to a stabilized area.
13. Re-seed any areas disturbed by construction and utilities installation with temporary seed mix within 3 days of completion of disturbance.
14. Grade the site to final elevations.
15. Install permanent seeding or sod.

All erosion and sediment control measures must be properly maintained throughout construction. Temporary and permanent seeding should be watered as needed until established. For further information on individual lot erosion and sediment control, please see the “Required Stormwater Controls on Individual Building Lots” in Appendix B and also the IDNR, Division of Soil Conservation’s pamphlet titled “Erosion and Sediment control for Individual Building Sites”.

E. CONSTRUCTION SITE RUNOFF CONTROL PROGRAM

Background

The City of Madison regulates grading, excavation or other activities that disturb topsoil and vegetation and have the potential to generate polluted storm water runoff. Activities of this nature must receive prior approval from the City of Madison and must be performed in accordance with erosion and sediment control practices approved by the City of Madison and the state of Indiana.

State of Indiana requirements are found in the Indiana Department of Environmental Management's (IDEM's) Construction Stormwater General Permit (CSGP). These requirements do not apply to agricultural or forest harvesting activities as detailed in the IDEM CSGP. Detailed information and forms can be found on the IDEM's " Construction/Land Disturbance Permitting" website.

Procedures and Requirements

Project sites that are 1 acre or larger, or part of a common plan of development that is 1 acre or larger, must comply with the following procedures:

- The project site owner or his representative must become familiar with, and comply with, the requirements of Indiana Department of Environmental Management's CSGP and the City of Madison Stormwater Management Ordinance. .
- Submit to the City of Madison a Storm Water Pollution Prevention Plan (SWPPP) that complies with current IDEM CSGP guidelines and the City of Madison Stormwater Ordinance. This will typically be done as part of the development plan review process. The SWPPP shall be submitted with the site development application.
- Prior to construction or grading operations, a pre-construction meeting must be held. The site owner's representative must coordinate this meeting with the Construction Site Inspector. The site owner's representative must comply with the 48-hour advanced notification requirement in IDEM's CSGP. A copy of the IDEM Notice of Intent (NOI) also must be provided to the City of Madison's Construction Site Inspector no less than 48 hours prior to beginning construction or site grading. A notice in compliance with IDEM CSGP Section 3.3 (a)(13) must be posted at the job site entrance and maintained throughout the duration of the project.

The items to be discussed at the pre-construction meeting should, at a minimum, include the following:

a) Name and contact information for the City's site inspector, the site owner's construction manager, and the site owner's representative responsible for construction site runoff control measures and notifications
b) Start date for construction or grading activities
c) Estimated completion date and post-construction stabilization requirements
d) IDEM notification requirements (NOI, Notice of Termination (NOT), newspaper publication, etc.)
e) Contents of approved Storm Water Pollution Prevention Plan
f) Enforcement measures
g) Inspection and maintenance of erosion/sediment control devices by owner's representative, including accessibility of records

h) Temporary seeding and stabilization requirements prior to project completion

At the completion of construction activities, a Notice of Termination must be issued and termination procedures described in the IDEM CSGP Section 6 must be followed.

F. Deposition of Spoil

Spoil material resulting from clearing, grubbing, and channel excavation shall be disposed of in a manner that will:

1. Minimize overbank wash.

2. Provide for the free flow of water between the channel and floodplain boundary unless the valley routing and water surface profiles are based on continuous dikes being installed.

3. Not hinder the development of travelways for maintenance.

4. Leave the right-of-way in the best condition feasible, consistent with the project purposes, for productive use by the owner.

5. Be accepted by the IDNR, IDEM, and COE, if applicable.

Chapter Eight

POST-CONSTRUCTION STORMWATER QUALITY MANAGEMENT STANDARDS

A. INTRODUCTION

It is recognized that developed areas, as compared to undeveloped areas, generally have increased imperviousness, decreased infiltration rates, increased runoff rates, and increased concentrations of pollutants such as fertilizers, herbicides, greases, oil, salts and other pollutants. As new development and re-development continues within the corporate boundaries of the City of Madison, measures must be taken to intercept and filter pollutants from stormwater runoff prior to reaching regional creeks, streams, and rivers. Through the use of appropriate Best Management Practices (BMPs), stormwater runoff will be filtered and harmful amounts of sediment, nutrients, and contaminants will be removed.

Requirements of the Ordinance and this Technical Standards Manual with regards to the channel protection and water quality protection can be satisfied through a variety of methods that can be broadly categorized as a conventional approach.
This Chapter establishes minimum standards for the selection and design of post-construction water quality and channel protection BMPs. The information provided in this Chapter establishes performance criteria for stormwater quality management and procedures to be followed when preparing a BMP plan for compliance. Post-construction BMPs must be sized to treat the water quality volume (WQv) and for flow-through BMPs the water quality discharge rate (Qwq). For Conventional approach, the methodology for calculating the WQv, and Qwq values is provided in Chapter 9.

B. POST-CONSTRUCTION BMPs PERFORMANCE CRITERIA

The City of Madison has established a minimum standard that the measurement of the effectiveness of the control of post-construction stormwater runoff quality will be based on removal of floatables in stormwater runoff and treatment, to the maximum extent practicable, of all major pollutants of concern expected for the proposed land use and/or those identified in the Stormwater Pollution Prevention Plan for the site (including, if applicable, those pollutants found to be the cause of the receiving stream to be listed in IDEM 303(d) list and Total Maximum Daily Load (TMDL) program) for the first inch of rainfall at the site as well as pollutants identified in approved stormwater master plans and/or watershed studies. The above-noted “maximum extent practicable” criterion is subject to a minimum of 80% removal of Total Suspended Solids (TSS). These requirements are adopted as the basis of the City’s stormwater quality management program for all areas of the jurisdiction.

C. POLLUTANTS OF CONCERN AFTER CONSTRUCTION STABILIZATION

There are three major sources of pollutants for a stabilized construction site:

- Deposition of atmospheric material (including wind-eroded material and dust)
- General urban pollution (thermal pollution, litter)
- Pollutants associated with specific land uses

It should be noted that some pollutants accumulate on impervious surfaces. This accumulated material is then subject to being washed into watercourses during storm events. It is for this reason that fish kills often occur during a rain event following a substantial rainless period. This is also the reason that the most hazardous driving conditions are realized after the initial onset of a storm event, when deposited oil has not yet washed into adjacent conveyance systems.

Post-construction pollutants of concern include:

- **Sediment** is the major pollutant of concern during active construction. Natural erosion processes are accelerated at a project site by the construction process for a number of reasons, including the loss of surface vegetation and compaction damage to the soil structure itself, resulting in reduced infiltration and increased surface runoff. After the construction is completed, other chemicals that are released to surface waters from industrial and municipal discharges and polluted runoff from urban and agricultural areas continue to accumulate to harmful levels in sediments.

- **Toxic chemicals** from illegal dumping and poor storage and handling of materials. Industrial sites pose the most highly variable source of this pollution due to the dependency of the specific process to the resulting pollution amounts and constituents. As during construction, these chemicals can pose acute (short-term) or chronic (long-term) risk to aquatic life, wildlife and the general public.

- **Bacteria** from illicit sanitary connections to storm sewer systems, combined sewers, leaking septic systems, wildlife and domestic animal waste. Bacteria pathogens pose a direct health risk to humans and aquatic life.

- **Nutrients** can be released from leaking septic systems or applied in the form of fertilizers. Golf courses, manicured landscapes and agricultural sources are the primary land uses associated with excess fertilization. Excessive nutrients in the local ecosystem are the source of algal blooms in ponds and lakes. These excessive nutrients also lead to acceleration of the eutrophication process, reducing the usable lifespan of these water bodies. Nitrogen and phosphorous are the primary nutrients of concern.

- **Oxygen demand** (biological or chemical) can be impacted by chemicals transported on sediment, by nutrients, and other pollutants (such as toxic chemicals). Reduced levels of oxygen impair or destroy aquatic life.

- **Oils and hydrocarbons** accumulate in streets from vehicles. They can also be associated with fueling stations and illicit dumping activities. Oils and hydrocarbons pose health risk to both aquatic and human health.

- **Litter, including floatables,** can result in a threat to aquatic life. The aesthetic impact can also reduce the quality of recreational use.

- **Metals** can be associated with vehicular activity (including certain brake dusts), buildings, construction material storage, and industrial activities. Metals are often toxic to aquatic life and threaten human health.

- **Chlorides** (salts) are historically associated with deicing activities. Chlorides are toxic to native aquatic life (verses saltwater aquatic life). Communities should consider a combination or cinders or sand to replace or supplement their deicing activities with chlorides. In addition, chloride stockpiles should remain covered.

- **Thermal effects** can be introduced by the removal of shade provided by riparian trees, as well as impervious channel linings, such as concrete, which release stored heat to water passing over them. Other sources of elevated temperature include effluent from power plant and industrial activities. Thermal pollution can threaten aquatic habitat, including fish species and beneficial water insects. Of particular concern are salmonoid streams, due to the effect of thermal pollution on spawning for this particular species.

D. WATER QUALITY CHARACTERISTICS BY LAND USE

Direct water quality sampling is not generally required at this time under the Phase II provisions. However, water quality characteristics are strongly tied to land use. For the purpose of these standards, all proposed developments and re-developments shall be assumed to involve increased levels of floatables, TSS, TP, TN, and metals. Additional pollutants may also be expected at certain types of developments and specific sites, as identified in the Stormwater Pollution Prevention Plan for the site (including, if applicable, those pollutants found to be the cause of the receiving stream to be listed in IDEM 303(d) list).

E. CONVENTIONAL APPROACH PROCEDURES

The following procedures shall be followed according to the Conventional approach:

Provide BMPs to address Water Quality Management

When the channel protection volume is controlled with BMPs that also remove pollutants of concern, often no additional calculation or BMP implementation is necessary. If the channel protection volume is not controlled through practices that also remove pollutants of concern, additional BMPs will be required. The City has designated a number of pre-approved BMP methods (listed in **Table 8-1**) to be used alone or in combination to achieve the stormwater quality performance criteria noted in Section B of this Chapter for runoff generated from up to first inch of rainfall on the entire site (disturbed and undisturbed) tributary to each outlet. Details regarding the applicability and design of these pre-approved BMPs, including the effectiveness of these BMPs in treating pollutants of concern (including, if applicable, those pollutants found to be the cause of the receiving stream to be listed in IDEM 303(d) list).

Innovative BMPs, including but not limited to, BMPs not previously accepted by the City must be certified by a professional engineer licensed in State of Indiana and approved through the City.

ASTM standard methods must be followed when verifying performance of new measures. New BMPs, individually or in combination, must meet the performance criteria noted in Section B of this Chapter, including the capture and removal of floatables. All innovative BMPs must have a low to medium maintenance requirement to be considered by the City. Testing to establish the pollutant removal rate must be conducted by an independent testing facility, not the BMP manufacturer. The accepted design flow rate for a Water Quality Device shall be the flow value at which the claimed removal rate for each pollutant is equaled or exceeded based on the unit's efficiency curve (flow rate versus removal rate graph).

Note that a single BMP measure may not be adequate to achieve the water quality requirements (as noted above) for a project. It is for this reason that a "treatment train", a number of BMPs in series, is often necessary for a project. The pollutant removal efficiency of a number of BMPs in series may be determined from the following formula:

$$E_{series} = 1 - (1-E_1)(1-E_2)(1-E_3)\ldots$$

where,
E_{series} = Removal Efficiency of the BMP series combined (in decimal form)
E_1, E_2, E_3,… = Removal Efficiency of Units 1, 2,3, …, respectively (in decimal form)

TABLE 8-1
Pre-approved Post-Construction BMPs for Conventional Approach

BMP[A]	Typical % TSS Removal Efficiency[B]	Maintenance Easement Requirements
Bioretention	90	25 feet wide along the perimeter
Constructed Wetland	67	25 feet wide along the outer perimeter of forebay & 30 feet wide along centerline of outlet
Infiltration Basin	87	25 feet wide along the perimeter
Infiltration Trench	90	25 feet wide along the perimeter
Constructed (Sand) Filter	70	25 feet wide along the perimeter
Water Quality Device	NA[C]	20 feet wide strip from access easement to chamber's access shaft
Vegetated Filter Strip	78	25 feet wide along the length on the pavement side
Vegetated Swale	81	25 feet wide along the top of bank on one side
Wet Ponds/Retention Basin	80	20 feet wide along the pond's perimeter as well as 25 feet wide along the outer perimeter of forebay (if provided) & 30 feet wide along centerline of outlet

Notes:

A. Detailed specifications for these BMPs are provided in the fact sheets contained in the BMP O&M Manual.
B. Removal rates shown are based on typical results. These rates are also dependent on proper installation and maintenance. The ultimate responsibility for determining whether additional measures must be taken to meet the Ordinance requirements for site-specific conditions rests with the applicant.
Based on IDEM Stormwater Quality Manual, 2007.
C. The removal rate for this category varies widely between various models and manufacturers. The acceptable treatment rate for these devices shall be based on that currently certified by the New Jersey Department of Environmental Protection (NJDEP). Such systems must remove all oil and floatable debris up to, and including, the Qwq calculated for each project. NJDEP-certified removal rates for various manufacturers are provided at http://www.nj.gov/dep/stormwater/treatment.html , with the treatment flow rate/design capacity information per unit provided at NJCAT website (http://www.njcat.org/verification-process/technology-verification-database.html).

F. SPECIAL PROVISIONS FOR "HOT SPOT" LAND USES

For all those projects involving land uses considered to be high pollutant producers or "hot spots" (see **Table 8-2** e.g., vehicle service and maintenance facilities, vehicle salvage yards and recycling facilities, vehicle and equipment cleaning facilities, fleet storage areas for buses, trucks, etc., industrial/commercial or any hazardous waste storage areas or areas that generate such wastes, industrial sites, restaurants and convenience stores, any activity involving chemical mixing or loading/unloading, outdoor liquid container storage, public works storage areas, commercial container nurseries, and some high traffic retail uses characterized by frequent vehicle turnover), additional water quality requirements may be imposed by the City in addition to those included in water quality criteria in order to remove potential pollutant loadings from entering either groundwater or surface water systems. These pre-treatment requirements are included in **Table 8-2** and **Table 8-3**.

Table 8-2
Pre-Treatment options for Stormwater Hot Spots

Stormwater Hot Spots	Minimum Pre-Treatment Options
Vehicle Maintenance and Repair Facilities	A, E, F, G
Vehicle Fueling Stations	A, D, G
Drive-through Restaurants, Pharmacies, Convenience Stores	B, C, D, I, K
Outdoor Chemical Mixing or Handling	G, H
Outdoor Storage of Liquids	G
Commercial Nursery Operations	I, J, L
Other Uses or Activities Designated by Appropriate Authority	As Required

Table 8-3
Minimum Pre-Treatment Options

Minimum Pre-Treatment Options	
A	Oil/Water Separators / Hydrodynamic Separators
B	Sediment Traps/Catch Basin Sumps
C	Trash/Debris Collectors in Catch Basins
D	Water Quality Inserts for Inlets
E	Use of Drip Pans and/or Dry Sweep Material under Vehicles/Equipment
F	Use of Absorbent Devices to Reduce Liquid Releases
G	Spill Prevention and Response Program
H	Diversion of Stormwater away from Potential Contamination Areas
I	Vegetated Swales/Filter Strips
J	Constructed Wetlands
K	Stormwater Filters (Sand, Peat, Compost, etc.)
L	Stormwater Collection and Reuse (especially for irrigation)
M	BMPs that are a part of a Stormwater Pollution Prevention Plan (SWPPP) under a NPDES Permit

G. CONSTRUCTION SEQUENCING CONSIDERATIONS

BMPs noted in this chapter refer to post-construction BMPs, which continue to treat stormwater after construction has been completed and the site has been stabilized. Installing certain BMPs, such as bioretention areas and sand filters, prior to stabilization can cause failure of the measure due to clogging from sediment. If such BMPs are installed prior to site stabilization, they should be protected by traditional erosion control measures.

In those instances, the construction sequence must require that the pond is cleaned out with pertinent elevations and storage and treatment capacities reestablished as noted in the accepted stormwater management plan.

H. Inspection and Maintenance Requirements

Subsequent to successful installation of Post-construction BMPs, they need to be inspected and maintained regularly in accordance with the Operation and Maintenance Manual required to be prepared for each BMP. An operations and maintenance (O&M) manual for all private infrastructure, including but not limited to pipes, ponds, ditches, and BMPs (when required), shall be submitted for the final plan approval and permit process. The manual will become a maintenance guide for the drainage infrastructure once development is complete. The final O&M manual will be provided to the City in both hard copy and digital formats. The O&M manual maintenance agreement along with a site map showing the BMP locations shall be recorded with the final plat. The O&M manual will include the following:

1. Owner name, address, business phone number, home phone number, email address, cellular phone number, pager number;
2. Site drawings (8½" by 11" or 11" by 17"), showing both plan and cross-section views, showing the infrastructure and applicable features, including dimensions, easements, outlet works, forebays, signage, etc., as well as an overall site map of the development showing all structures;
3. Guidance on owner-required periodic inspections;
4. Requirement of owner to perform maintenance specified by City inspection, if any;
5. Guidance on routine maintenance, including mowing, litter removal, woody growth removal, signage, etc.;
6. Guidance on remedial maintenance; such as inlet replacement, outlet works maintenance, etc.;
7. Guidance on sediment and trash removal, both narrative and graphical, describing when sediment removal should occur in order to insure that BMPs and other infrastructure remain effective as water quality and/or quantity control devices;
8. A statement that the City's representatives have the right to enter the property to inspect the infrastructure;
9. A tabular schedule showing inspection and maintenance requirements; and
10. Identification of the property owner as the party responsible for all maintenance, including cost.

A sample Stormwater Long-Term Operation and Maintenance Agreement is provided in Appendix B. This agreement will need to be customized, signed, notarized, and recorded so that it can be a part of the property's deed.

Chapter Nine

METHODOLOGY FOR DETERMINATION OF REQUIRED SIZING OF BMPs

This Chapter describes the acceptable methods for calculating Channel Protection Volume (CPv), Water Quality Volume (WQv), and Flow-Through BMP Flow Rate associated with Conventional Stormwater Management Approach. Channel Protection is achieved through retention or extended detention of runoff volume for 1-year, 24-hour storm event. Structural Water Quality treatment is achieved by treating the first inch of rainfall, either through retention/detention BMPs or by Flow-through BMP's. Detention/Retention BMP's impound (pond) the runoff to be treated, while flow-through BMP's treat the runoff through some form of filtration process.

A. RETENTION/DETENTION BMP SIZING

Water Quality Volume

Water Quality Detention BMP's must be designed to store the WQv for treatment. The WQv is the storage needed to capture and treat the runoff from the first one inch of rainfall. The water quality volume is equivalent to one inch of rainfall multiplied by the Volumetric Runoff Coefficient (Rv) multiplied by the site area.

A calculation methodology similar to that described for CPv may be utilized, except that the rainfall depth (P) will be equal to 1 inch, instead of the 1-year, 24-hour depth.

Alternatively, a simpler method may be used for the calculation of WQv:

$$WQv = ((P)\ (Rv)\ (A)) / 12$$

Where:

WQv = water quality volume for each site's outlet (acre-feet)
P = 1 inch
Rv = volumetric runoff coefficient
A = area in acres

The volumetric runoff coefficient is a measure of imperviousness for the contributing area, and is calculated as:

$$Rv = 0.05 + 0.009(I)$$

Where:

I = the percent impervious cover

For example, a proposed commercial site will be designed to drain to three different outlets, with the following drainage areas and impervious percentages:

Subarea ID	On-site Contributing Area (acres)	Impervious Area (%)	Off-Site Contributing Area (acres)
A	7.5	80	0.0
B	4.3	75	0.0
C	6.0	77	0.0

Calculating Rv for subareas A, B and C yields:

Rv (subarea A) = 0.05+0.009(80) = 0.77
Rv (subarea B) = 0.05+0.009(75) = 0.73
Rv (subarea C) = 0.05+0.009(77) = 0.74

The water quality volumes for these three areas are then calculated as:

WQv (subarea A) = (1")(Rv)(A)/12 = (1)(0.77)(7.5)/12 = 0.47 acre-feet
WQv (subarea B) = 0.73(4.3)/12 = 0.26 acre-feet
WQv (subarea C) = 0.74(6.0)/12 = 0.37 acre-feet

Note that this example assumed no offsite sources of discharge through the water quality BMP's. If there were significant sources of off-site runoff (sometimes called run-on for upstream areas draining to the site), the designer would have the option of bypassing off-site runoff around the on-site systems or the detention BMP should be sized to treat the on-site channel protection volume plus the water quality volume for the off-site sources.

B. FLOW THROUGH BMP SIZING

Flow-through BMP's are designed to treat runoff at a peak design flow rate through the system. Examples of flow through BMP's include catch basin inserts, sand filters, and grassed channels. Another flow through BMP which is gaining popularity is a hydrodynamic separator or other similar type of device. Hydrodynamic separators are proprietary and usually include an oil-water separation component. Hydrodynamic separators (i.e. Stormwater Quality Units (SQU's) or Manufactured Treatment Devices (MTD's)) located on the New Jersey Department of Environmental Protection (NJDEP) MTD approval listing will be accepted when installed either off-line or in-line depending on manufacturer's approved specifications. New units not on this list will be accepted on a case by case basis with 3rd party testing data and specifications required as well as a written narrative explaining the water quality benefits of the BMP. Runoff rate calculations for each site should be completed according to the instructions in these Standards for the one inch rainfall event. Once a runoff rate has been determined, a unit with a corresponding acceptable treatment rate can be selected from the

NJDEP listing. For treatment device O&M manuals, applicants shall at a minimum follow the standard treatment unit checklists and notes as provided in the listing unless these conflict with other local standards. In the event that the NJDEP approval listing no longer exists, applicants shall provide independent, third party documentation to prove that a treatment unit meets TSS removal to the highest extent practicable. For innovative BMPs, the accepted design flow rate for a MTD shall be the flow value at which the claimed removal rate for each pollutant is equaled or exceeded based on the unit's efficiency curve (flow rate versus removal rate graph).

The following procedure should be used to estimate peak discharges for flow through BMPs (adopted from Maryland, 2000). It relies on the volume of runoff computed using the Small Storm Hydrology Method (Pitt, 1994) and utilizes the NRCS, TR-55 Method.

Using the WQv methodology, a corresponding Curve Number (CNwq) is computed utilizing the following equation:

$$CNwq = \frac{1000}{\left[10 + 5P + 10Qa - 10\sqrt{Qa^2 + 1.25QaP}\right]}$$

Where:

CNwq = curve number for water quality storm event
P = 1" (rainfall for water quality storm event)
Qa = runoff volume, in inches = 1"×Rv
Rv = volumetric runoff coefficient (see previous section)

Due to the complexity of the above equation, the water quality curve number is represented as a function of percent imperviousness in **Figure 9-1**.

The water quality curve number, CNwq, is then used in conjunction with the standard calculated time-of-concentration, T_c, and drainage area as the basis input for TR-55 calculations. Using the NRCS Type 2 distribution for 1 inch of rainfall in 24-hours, the water quality treatment rate, Qwq, can then be calculated.

REFERENCES

1. Maryland Stormwater Design Manual, Volume II, Appendix D.10, 2000

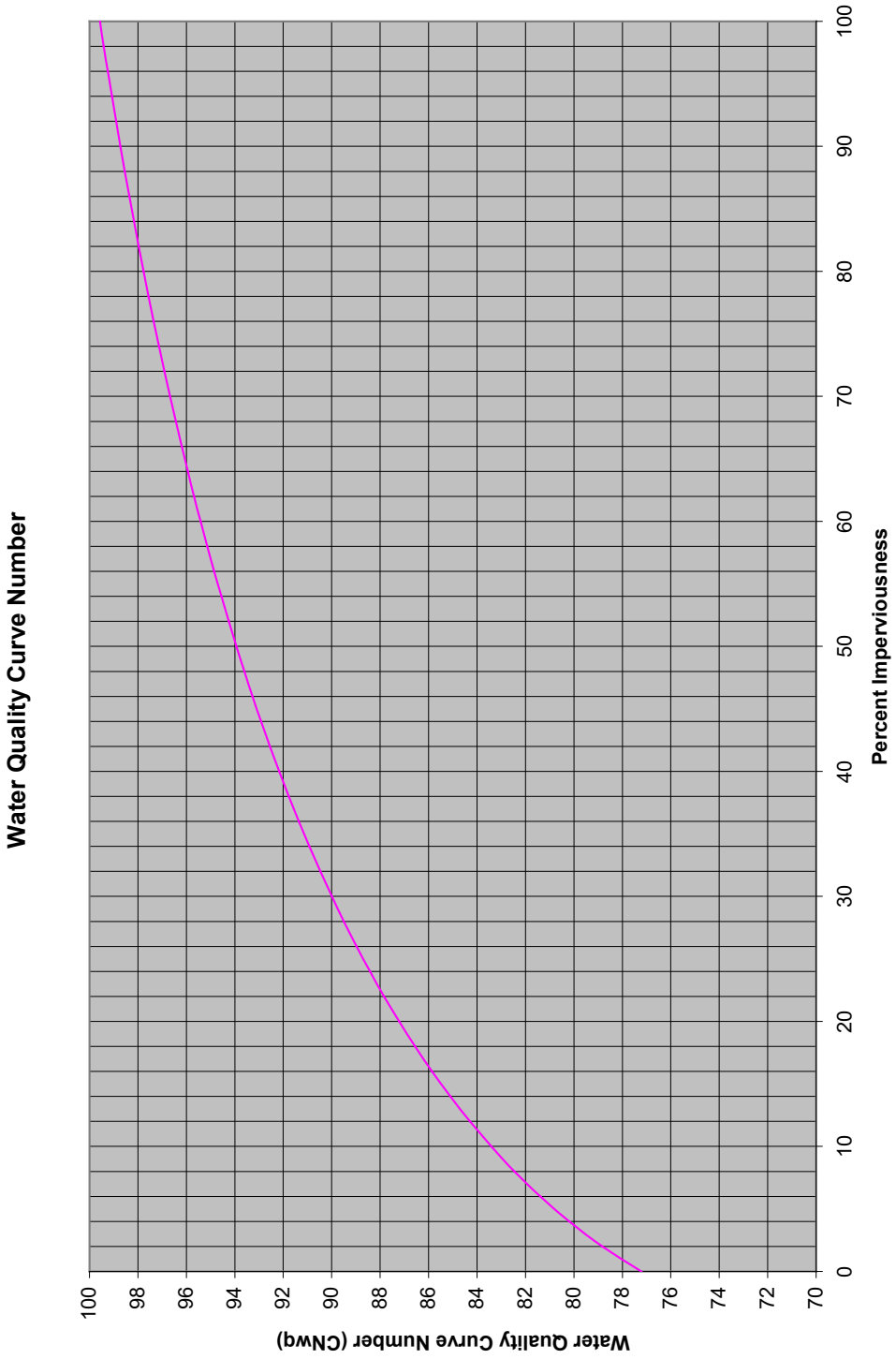
2. Pitt, R., 1994, Small Storm Hydrology. University of Alabama - Birmingham. Unpublished manuscript. Presented at design of stormwater quality management practices. Madison, WI, May 17-19 1994.

3. Schueler, T.R. and R.A. Claytor, 1996, Design of Stormwater Filter Systems. Center for Watershed Protection, Silver Spring, MD.

4. United States Department of Agriculture (USDA), 1986. Urban Hydrology for Small Watersheds. Soil Conservation Service, Technical Release 55 (TR-55).

Figure 9-1

Curve Number Calculation for Water Quality Storm Event



Chapter Ten

MISCELLANEOUS REQUIREMENTS

A. GRADING AND BUILDING PAD ELEVATIONS

Maximum yard slopes are 3:1 where soil has been disturbed during construction processes. Finished floor elevation must be no less than 6 inches above finished grade around the building. Also, the building's lowest entry elevation that is adjacent to and facing a road shall be a minimum of 15 inches above the road centerline elevation unless a written variance is granted by the City.

All lots shall have a minimum flood protection grade shown on the secondary plat. Minimum Flood Protection Grade of all structures fronting a pond or open ditch shall be no less than 2 feet above any adjacent 100-year local or regional flood elevations, whichever is greater, for all windows, doors, unsealed pipe entrances, window well rim elevations, and any other structure member where floodwaters can enter a building.

The Lowest Adjacent Grade for residential, institutional, commercial, or industrial buildings, whether shown or not on a FEMA or IDNR designated floodplain, shall have two feet of freeboard above the flooding source's 100-year flood elevation under proposed conditions, unless the flooding source is a rear-yard swale. When the flooding source is a rear-yard swale, the Lowest Adjacent Grade for residential, institutional, commercial, or industrial buildings shall have 2 feet of freeboard above the 100-year flood elevation under proposed conditions.

B. LOT DRAINAGE

All lots shall be laid out so as to provide drainage away from all buildings, and individual lot drainage shall be coordinated with the general stormwater drainage pattern for the subdivision. Drainage shall be designed so as to avoid the concentration of stormwater runoff from a lot onto adjacent lots. Each lot owner shall maintain the lot grade, as it relates to stormwater drainage, in compliance with the approved construction plans.

No part of the lot area of any lot may contain land that is utilized as retention or detention facility or drainage pond, contains a watercourse, or is within a floodway. Where a watercourse separates the buildable area of the lot from the street by which it has access, provisions shall be made for the installation of a culvert or other appropriate structure, as approved by the City. If a subdivision contains an existing or to be developed waterbody, watercourse, or portion thereof, appropriate documentary assurances acceptable to the City shall be provided for the maintenance of such waterbody or watercourse.

It shall be the property owners' responsibility to maintain the natural features on their lots and to take preventive measures against any and all erosion and/or deterioration of natural or manmade features on their lots.

C. ACCEPTABLE OUTLET AND ADJOINING PROPERTY IMPACTS REQUIREMENTS

Design and construction of the stormwater facility shall provide for the discharge of the stormwater runoff from off-site land areas as well as the stormwater from the area being developed (on-site land areas) to an acceptable outlet(s) (as determined by the City) having capacity to receive upstream (off-site) and on-site drainage. A Roadside Ditch is generally not considered an adequate outlet. The flow path from the development outfall(s) to a regulated drain, a City storm drain, or natural watercourse (as determined or approved by the City) shall be provided on an exhibit that includes topographic information. Any existing field tile encountered during the construction shall not be allowed to be connected into the storm sewer system.

Where the outfall from the stormwater drainage system of any development flows through real estate owned by others prior to reaching a regulated drain or watercourse, no approval shall be granted for such drainage system without a recorded easement for such real estate. In addition, no activities conducted as part of the development shall be allowed to obstruct the free flow of floodwaters from an upstream property.

If an adequate outlet is not located on site, then off-site drainage improvements may be required. Those improvements may include, but are not limited to, extending storm sewers, clearing, dredging and/or removal of obstructions to open drains or natural water courses, and the removal or replacement of undersized culvert pipes as required by the City.

D. NO NET LOSS FLOODPLAIN STORAGE REQUIREMENTS

Floodplains exist adjacent to all natural and man-made streams, regardless of contributing drainage area or whether they have been previously identified or mapped. Due to potential impacts of floodplain loss on peak flows in streams and on the environment, disturbance to floodplains should be avoided.

When the avoidance of floodplain disturbance is not practical, the natural functions of the floodplain should be preserved to the extent possible.

In an attempt to strike a balance between the legitimate need for economic development within the City corporate boundaries and the need to preserve the natural functions of floodplains to the extent possible, compensatory excavation equivalent to the floodplain storage lost shall be required for all activities within floodplain of streams located in the City where drainage area of the stream is equal to or larger than one square mile. The City may alter the compensation ratio, based on extenuating circumstances, for a specific project.

General Requirements

Note that by definition, compensatory storage is the replacement of the existing floodplain and, in rare exceptions, the floodway storage lost due to fill. Compensatory storage is required when a portion of the floodplain is filled, occupied by a structure, or when as a result of a project a change in the channel hydraulics occurs that reduces the existing available floodplain storage. Compensatory storage must:

- Be provided regardless of whether the flooding source is mapped or whether flood elevations are published or not. When flood elevations are not available for a flooding source that has a drainage area equal to or larger than one (1) square miles (640 acres), the applicant is to determine the 10-year and 100-year flood elevations at the site and get them approved by the IDNR prior to use for floodplain compensation calculations.
- Equal at least 1 times the volume of flood storage lost below the 10-year and 100-year flood elevations;
- Be operational prior to placement of fill, structures, or other materials temporarily or permanently placed in the regulatory floodplain;
- Be provided in the immediate vicinity of the flood storage lost, where practical;
- Be provided in such a way to mimic as close as possible the function provided by the lost floodplain storage. If the floodplain storage is to be lost outside the active flow conveyance path, then it must be compensated for outside the flow conveyance path (e.g., a flood conveyance shelf/2-stage ditch, while improving conveyance and erosion, is not an appropriate compensation for floodplain storage lost in the floodway fringe area).
- Be provided in addition to the site retention/detention volume; and
- Drain freely and openly to the waterway.

Compensatory storage is also required to be provided incrementally such that:

- All floodplain storage/conveyance capacity lost within the floodway shall be compensated for within the floodway;
- All floodplain storage lost within the floodway fringe shall be compensated for within the floodway fringe;
- All floodplain storage lost below the existing 10-year flood elevation shall be compensated for below the proposed 10-year flood elevation; and
- All floodplain storage lost above the existing 10-year flood elevation shall be compensated for above the proposed 10-year flood elevation.

Note that compensatory storage is required for activities in the regulatory floodplain. There is no threshold to compensatory storage; any volume of fill requires compensatory storage be provided. However, the compensatory storage requirement does not apply to specific activities in the regulatory floodplain, such as the floodproofing of an existing building, where the floodproofing measures such as berms or floodwalls are within 10 feet of the building, or crossing

improvements, where artificially created storage is lost due to a reduction in head loss.

Computing Compensatory Storage

Computations must show 1 times compensation for floodplain storage volume lost for 10-year and 100-year storm events. Storage lost between the existing ground and the existing 10-year flood elevation must be compensated by providing 1 times the amount lost and be placed between the existing ground elevation and the proposed 10-year floodplain elevation. Storage lost between the existing 10-year and the existing 100-year elevation must be compensated by providing 1 times the amount lost and be placed between the proposed 10-year elevation and proposed 100-year elevation.

When preparing a grading plan, thought should be given to how compensatory storage will be quantified. The most common methodology is the use of cross sections and the "average end area method". The following requirements should be followed when preparing cross sections:

1. Prepare a detailed topographic survey tied to North American Vertical Datum of 1988 and the local Survey Control Network benchmarks.

2. Locate cross sections parallel to each other and perpendicular to a reference line, often times a property line or fence line. Cross sections used in a hydraulic model are always perpendicular to flood flows, and not always parallel to each other. Therefore, these are often not suitable for computing flood fringe compensatory storage volumes.

3. Plot cross sections at a standard engineering scale so as to allow the reviewer to verify areas. Horizontal scale should be a maximum of 1 inch = 50 feet and vertical scale should be a maximum of 1 inch = 5 feet, or as approved by the City.

4. Show existing grades, proposed grades, existing and proposed 10-year flood elevations, existing and proposed 100-year flood elevations, normal water level, a reference line, and floodway limits on the cross sections on the plans.

5. Locate cross sections no more than 150 feet apart, with a minimum of three cross sections per cut/fill area, or as necessary to accurately quantify cuts and fills.

6. Locate cross sections to pick up critical features such as berms, ditches, and existing and proposed structures.

7. Each cross section should be numbered or lettered and referenced on the plans.

This information is then utilized to compute the areas of cut and fill. A sample grading plan, a typical cross section, and associated compensatory storage calculations for the 10-year flood are provided on **Figures 10-1**, **Figure 10-2**, and **Table 10-1**, respectively.

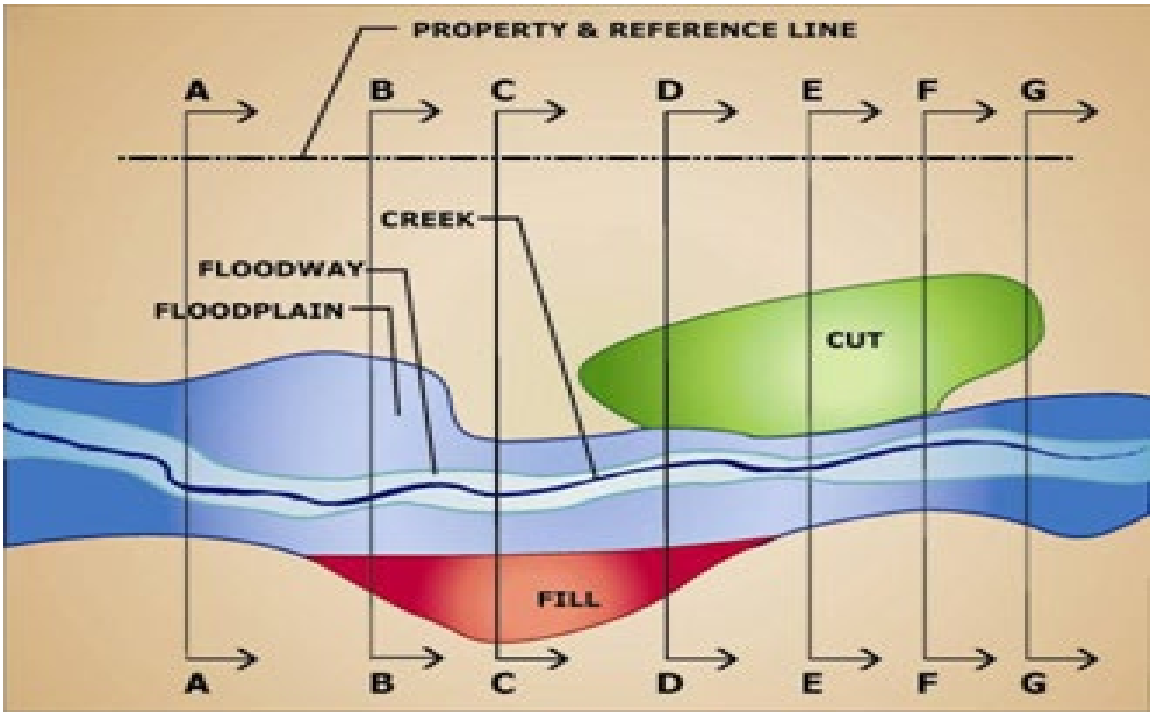
Volume of Fill between cross sections are calculated by finding the average fill cross sectional area and multiplying it by the distance between the two cross sections. For example, the fill volume between cross sections A and B is calculated as follows:

Average Fill Area = (Fill Area "A" + Fill Area "B")/2 = (0 ft^2 +100 ft^2)/2 = 50 ft^2
Volume of Fill = (Average Fill Area) × (Distance) = (50 ft^2) × (150 ft) = 7,500 ft^3

Once the total volume of fill placed, for this example, between the 0-and 10-yr flood elevations is determined, the total required compensatory storage can be calculated and compared against the total compensatory storage volume provided by the design as shown in the table. For this example:

Required Compensatory Storage = (1) × (Total Volume of Fill)
= (1) × (36,250 ft^3) = 36,250 ft^3

Figure 10-1 Example Compensatory Storage Grading Plan



* Not to Scale & Topography not shown for clarity.

Figure 10-2 Example Cross Section D-D

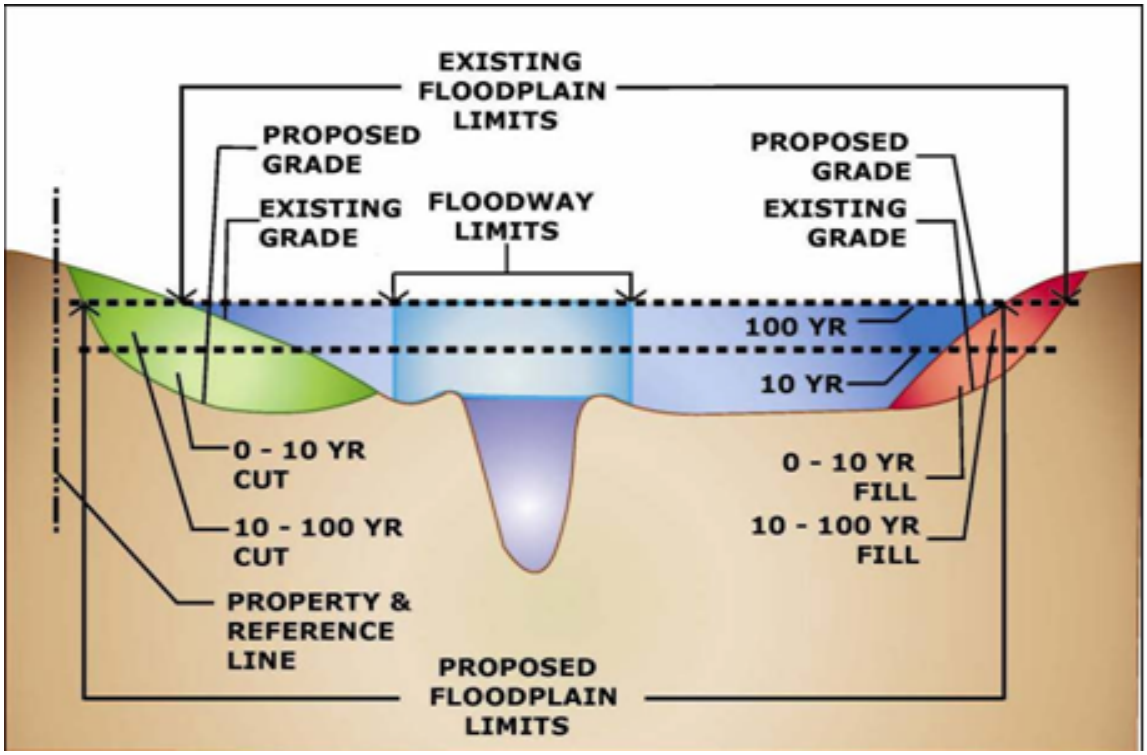


Table 1 - Example Compensatory Storage Calculations for 0 through 10-Year Event

Cross Section	Distance Between Sections (ft)	Fill Area (ft^2)	Average Fill Area (ft^2)	Volume of Fill (ft^3)	Cut Area (ft^2)	Average Cut (ft^2)	Volume of Cut (ft^3)
A		0			0		
	150		50	7,500		0	
B		100			0		
	90		125	11,250		20	1,800
C		150			40		
	100		125	12,500		65	6,500
D		100			90		
	100		50	5,000		100	10,000
E		0			110		
	100		0	0		120	12,000
F		0			130		
	85		0	0		85	7,225
G		0			40		
Total Fill				**36,250**	Total Cut		**37,525**

Since the total amount of cut provided (37,525 ft^3 as shown in the table) is larger than that required (36,250 ft^3), the design meets the compensatory storage requirement for the 10-year flood. An additional table and calculation should be completed for the 100-year flood elevation in a similar manner to determine whether the design meets the compensatory storage requirement for the 100-year flood.

Location of Compensatory Storage

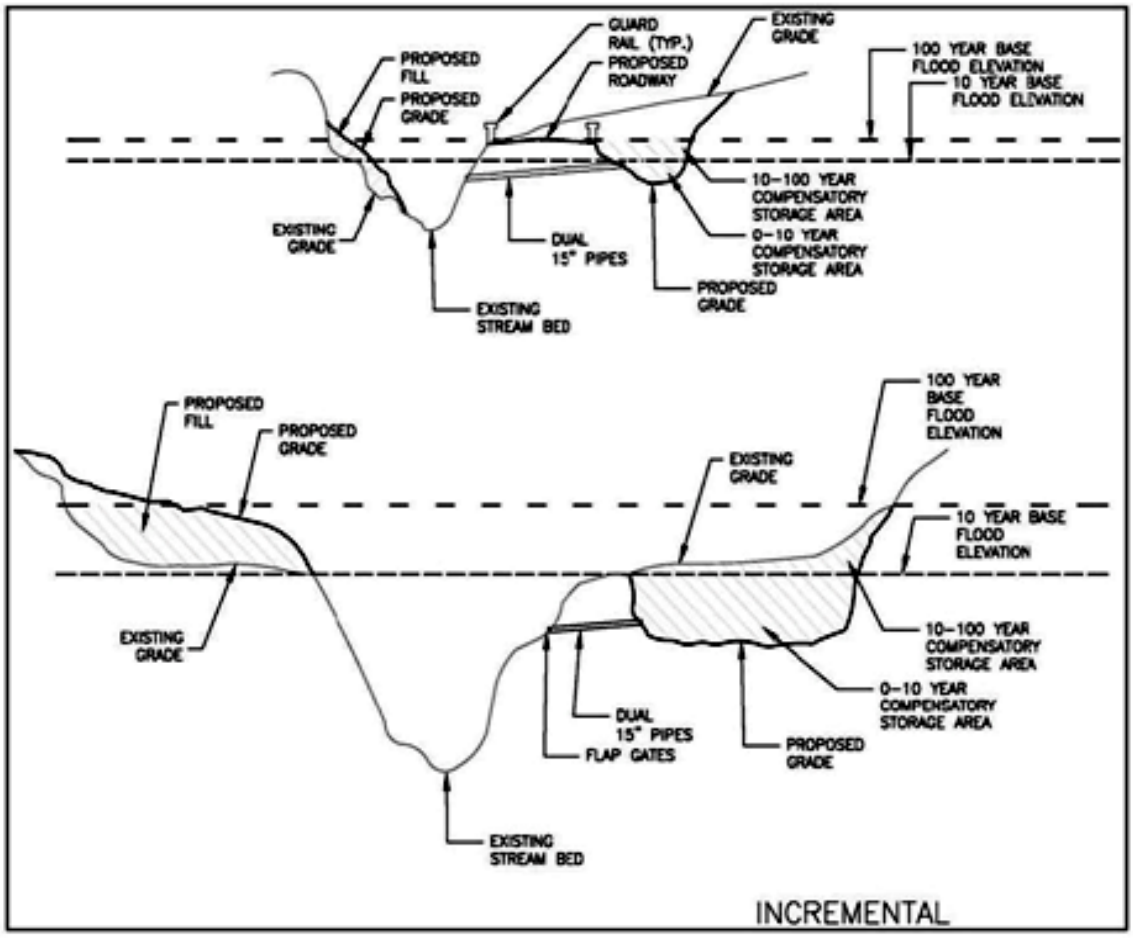
Compensatory storage must be located on-site and adjacent to or opposite the areas filled or occupied by a structure. In those rare instances when compensatory storage cannot be located adjacent to or opposite to the areas filled or occupied, engineering computations demonstrating that hydraulically equivalent compensatory storage has been provided is required. These computations must show that no increase in flood flows or flood depths will result as a result of the location of the proposed compensatory storage.

Compensatory storage must be constructed to drain freely and openly to watercourses. In some rare cases it may be necessary to install pipes to construct and/or operate a compensatory storage basin. This may occur when site constraints, such as a roadway or sidewalk, separate the waterway from the compensatory storage area. This is illustrated in the top half of **Figure 10-3**.

Another scenario may occur when a site cannot meet the incremental storage requirements discussed in this document. If incremental storage requirements from the 10-year to 100-year elevations cannot be met, pipes could be installed with a flap gate to prevent the water from entering from the stream bed at lower elevations. The berm could then be set at the elevation of the 10-year flood elevation, thus allowing the storage to only become effective above the 10-year flood elevation. This is illustrated in the bottom half of the illustration in Figure 10-3.

The use of pipes in compensatory storage will require approval by the City. If approved, two pipes will be required to reduce the risk of clogging. Pipes must be a minimum of 15 inches in diameter so as to allow water to enter and exit freely with a minimum head differential. If the compensatory storage is proposed to be combined with detention, it must be demonstrated the compensatory storage and detention do not interfere with one another.

Figure 10-3 Example of Compensatory Storage Area Connection to Stream through Pipe



Compensatory Storage in the Regulatory Floodway

Only fill associated with appropriate uses of the regulatory floodway will be allowed to fill within the limits of the floodway. All provisions discussed above relating to compensatory storage must be met in addition to the items discussed below.

- Any fill placed within the existing floodway must be compensated for within the proposed floodway.
- All floodway storage lost below the existing 10-year base flood elevation shall be replaced below the proposed 10-year base flood elevation.

- All floodway storage lost between the existing 10-year flood elevation and the existing 100-year flood elevation shall be replaced between the proposed 10-year and proposed 100-year flood elevation.

There shall be no reduction in floodway surface area as a result of a floodway modification, unless such modification is necessary to reduce flooding at an existing structure.

E. REQUIREMENTS ASSOCIATED WITH DAMS AND LEVEES

Dams and levees have the potential for significant, sometimes catastrophic consequences should they fail. In order to minimize the potential for loss of life and public safety, decrease the potential for increased flood damage and disaster costs, and safeguard the downstream property rights, the following shall be required by the City for any proposed new or improvements to any existing dam or levee. These requirements are in addition to what is normally required for other development subject to the Ordinance or these Technical Standards and/or that required by State or Federal agencies.

1. Design of dams shall follow the requirements of the latest edition of IDNR-Division of Water "General Guidelines for New Dams and Improvements to Existing Dams in Indiana" as well as principles provided in the latest edition of "Indiana Dam Safety Inspection Manual".

2. Design of levee/floodwalls shall follow the FEMA requirements and guidelines provided in 44 CFR Section 65.10 and USACE Engineer Manual 1110-2-193, Design and Construction of Levees.

3. An Incident and Emergency Action Plan (IEAP), including a detailed dam breach inundation map, shall be developed in accordance with the template provided in the latest edition of "Indiana Dam Safety Inspection Manual" and submitted to the City. The detailed dam breach inundation map referenced in this paragraph shall be developed for both "Sunny Day Breach" Scenario (breach during normal loading conditions) and for maximum loading condition with breach assumed to occur as the spillway system is passing the Spillway Design Flood (SDF) associated with the dam ("SDF + Breach" Scenario).

4. Unless the "Sunny Day Breach Inundation Area" is entirely contained within the applicant's property and/ or contained within the existing 100-year floodplain, a copy of recorded flood/inundation easement or a recorded written consent for every property within the potential "Sunny Day Breach Inundation Area" shall be submitted to the City. In addition, all the affected property owners whose properties are located within the "SDF + Breach Inundation Area" must be notified of a hearing relevant to the proposed added flooding risk, should such a man-made structure suffer a catastrophic failure.

Notification of the time and place of the hearing shall be made in person or by certified mail at least five (5) to ten (10) days prior to the hearing. Proof of notice to each landowner shall be filed by affidavit with the City prior to the hearing.

5. A copy of a Management and Maintenance Plan for the proposed dam or levee developed in accordance with the latest edition of "Indiana Dam Safety Inspection Manual" shall be submitted to the City.

6. Unless a dam is subject to and regulated by the IDNR, following the permitting and construction of the dam or levee, a copy of a formal periodic inspection report prepared in accordance with the recommendations contained in the latest edition of "Indiana Dam Safety Inspection Manual" shall be submitted to the City along with evidence that the identified maintenance deficiencies have been corrected. The inspection report has to be submitted as it gets completed in accordance with the inspection frequency recommended in the latest edition of "Indiana Dam Safety Inspection Manual".

APPENDIX A

ABBREVIATIONS AND DEFINITIONS

APPENDIX A

ABBREVIATIONS AND DEFINITIONS

ABBREVIATIONS

BFE	Base Flood Elevation
BMP	Best Management Practice
CFS	Cubic Feet Per Second
CLOMR	Conditional Letter of Map Revision (from FEMA)
CLOMR-F	Conditional Letter of Map Revision Based on Fill (from FEMA)
CN	Curve Number
COE	United States Army Corps of Engineers
CSMP	Comprehensive Stormwater Management Program
CSO	Combined Sewer Overflow
CWA	Clean Water Act
ERM	Elevation Reference Mark
E&SC	Erosion and Sediment Control
EPA	Environmental Protection Agency
ETJ	Extraterritorial Jurisdiction
FBFM	Flood Boundary and Floodway Map
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Map
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FPG	Flood Protection Grade
FPS	Feet Per Second
GIS	Geographical Information System
GPS	Global Positioning System
HGL	Hydraulic Grade Line
HHW	Household Hazardous Waste
HUC	Hydrologic Unit Code

IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
INDOT	Indiana Department of Transportation.
LAG	Lowest Adjacent Grade
LOMA	Letter of Map Amendment (from FEMA)
LOMR	Letter of Map Revision (from FEMA)
LOMR-F	Letter of Map Revision Based on Fill (from FEMA)
MCM	Minimum Control Measure
MS4	Municipal Separate Storm Sewers
NAVD	North American Vertical Datum of 1988
NFIP	National Flood Insurance Program
NGVD 1929	National Geodetic Vertical Datum of 1929
NRCS	USDA-Natural Resources Conservation Service
NPDES	National Pollution Discharge Elimination System
NPS	Non-point source
POTW	Publicly Owned Treatment Works
SFHA	Special Flood Hazard Area
SWCD	Soil and Water Conservation District
SWPPP	Stormwater Pollution Prevention Plan
SWQMP	Stormwater Quality Management Plan
Tc	Time of Concentration
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

DEFINITIONS

Acre-Foot (AF). A measure of water volume equal to the inundation of a flat one-acre area to a depth of one foot (43,560 cubic feet).

Administering authority. The designated unit of government given the authority to issue permits.

Agricultural land disturbing activity. Tillage, planting, cultivation, or harvesting operations for the production of agricultural or nursery vegetative crops. The term also includes pasture renovation and establishment, the construction of agricultural conservation practices, and the installation and maintenance of agricultural drainage tile. For purposes of this rule, the term does not include land disturbing activities for the construction of agricultural related facilities, such as barns, buildings to house livestock, roads associated with infrastructure, agricultural waste lagoons and facilities, lakes and ponds, wetlands; and other infrastructure.

Agricultural land use conservation practices. Use of land for the production of animal or plant life, including forestry, pasturing or yarding of livestock, and planting, growing, cultivating, and harvesting crops for human or livestock consumption. Practices that are constructed on agricultural land for the purposes of controlling soil erosion and sedimentation. These practices include grass waterways, sediment basins, terraces, and grade stabilization structures.

Amortization Period. The length of time used to repay a debt or mortgage or to depreciate an initial cost.

Antecedent Runoff Condition. The index of runoff potential before a storm event. The index, developed by the Soil Conservation Service (SCS), is an attempt to account for the variation of the SCS runoff curve number (CN) from storm to storm.

Backflow Preventer. Device that allows liquids to flow in only one direction in a pipe. Backflow preventers are used on sewer pipes to prevent a reverse flow during flooding situations.

Backwater. The rise in water surface elevation caused by some obstruction such as a narrow bridge opening, buildings or fill material that limits the area through which the water shall flow.

Base Flood Elevation. The water surface elevation corresponding to a flood having a one percent probability of being equaled or exceeded in a given year.

Base Flood. See "Regulatory Flood".

Base Flow. Stream discharge derived from groundwater sources as differentiated from surface runoff. Sometimes considered to include flows from regulated lakes or reservoirs.

Basement. A building story that is all or partly underground but having at least one-half of its height below the average level of the adjoining ground. A basement shall not be counted as a story for the purpose of height regulations.

Benchmark. A marked point of known elevation from which other elevations may be established.

Best Management Practices. Design, construction, and maintenance practices and criteria for stormwater facilities that minimize the impact of stormwater runoff rates and volumes, prevent erosion, and capture pollutants.

Buffer Strip. An existing, variable width strip of vegetated land intended to protect water quality and habitat.

Building. See “structure”.

Capacity of a Storm Drainage Facility. The maximum flow that can be conveyed or stored by a storm drainage facility without causing damage to public or private property.

Catch Basin. A chamber usually built at the curb line of a street for the admission of surface water to a storm drain or subdrain, having at its base a sediment sump designed to retain grit and detritus below the point of overflow.

Centerline of Channel. The thalweg of a channel.

Channel Improvement. Alteration, maintenance, or reconstruction of the channel area for the purpose of improving the channel capacity or overall drainage efficiency. The noted "improvement" does not necessarily imply water quality or habitat improvement within the channel or its adjacent area.

Channel Modification. Alteration of a channel by changing the physical dimensions or materials of its bed or banks. Channel modification includes damming, rip-rapping or other armoring, widening, deepening, straightening, relocating, lining, and significant removal of bottom or woody vegetation. Channel modification does not include the clearing of dead or dying vegetation, debris, or trash from the channel. Channelization is a severe form of channel modification typically involving relocation of the existing channel (e.g., straightening).

Channel Stabilization. Protecting the sides and bed of a channel from erosion by controlling flow velocities and flow directions using jetties, drops, or other structures and/or by fining the channel with vegetation, riprap, concrete, or other suitable lining material.

Channel. A portion of a natural or artificial watercourse which periodically or continuously contains moving water, or which forms a connecting link between two bodies of water. It has a defined bed and banks which serve to confine the water.

Class V injection well. A type of well, which typically has a depth greater than its largest surface dimension, emplaces fluids into the subsurface, and does not meet the definitions of Class I through Class IV wells as defined under 40 CFR 146.5. While the term includes the specific examples described in 40 CFR 144.81, septic systems that serve more than one (1) single-family dwelling or provide service for non-domestic waste, dug wells, bored wells, improved sinkholes, french drains, infiltration sumps, and infiltration galleries, it does not include surface impoundments, trenches, or ditches that are wider than they are deep.

Closed Conduit. A pipe, tube, or tile used for transmitting water.

Combined Sewer Overflow. A system designed and used to receive and transport combined sewage so that during dry periods the wastewater is carried to a treatment facility. During storm events, the excess water is discharged directly into a river, stream, or lake without treatment.

Compensatory Storage. An artificial volume of storage within a floodplain used to balance the loss of natural flood storage capacity when artificial fill or substructures are placed within the floodplain.

Compost. Organic residue (or a mixture of organic residue and soil) that has undergone biological decomposition until it has become relatively stable humus.

Comprehensive Stormwater Management Program. A comprehensive stormwater program for effective management of stormwater quantity and quality throughout the community.

Constructed Wetland. A manmade shallow pool that creates growing conditions suitable for wetland vegetation and is designed to maximize pollutant removal.

Construction activity. Land disturbing activities, and land disturbing activities associated with the construction of infrastructure and structures. This term does not include routine ditch or road maintenance or minor landscaping projects.

Construction plan. A representation of a project site and all activities associated with the project. The plan includes the location of the project site, buildings and other infrastructure, grading activities, schedules for implementation and other pertinent information related to the project site. A stormwater pollution prevention plan is a part of the construction plan.

Construction site access. A stabilized stone surface at all points of ingress or egress to a project site, for the purpose of capturing and detaining sediment carried by tires of vehicles or other equipment entering or exiting the project site.

Contiguous. Adjoining or in actual contact with.

Contour Line. Line on a map which represents a contour or points of equal elevation.

Contour. An imaginary line on the surface of the earth connecting points of the same elevation.

Contractor or subcontractor. An individual or company hired by the project site or individual lot owner, their agent, or the individual lot operator to perform services on the project site.

Control Structure. A structure designed to control the rate of flow that passes through the structure, given a specific upstream and downstream water surface elevation.

Conveyance. Any structural method for transferring stormwater between at least two points. The term includes piping, ditches, swales, curbs, gutters, catch basins, channels, storm drains, and roadways.

Convolution. The process of translating precipitation excess into a runoff hydrograph.

Crawl Space. Low space below first floor of a house where there has not been excavation deep enough for a basement, usually less than seven (7) feet in depth, but where there is access for pipes, ducts, utilities and similar equipment.

Critical Duration Analysis. The process of testing different rainfall durations to find that “critical duration”, which produces the highest peak runoff or the highest storage volume.

Cross-Section. A graph or plot of ground elevation across a stream valley or a portion of it, usually along a line perpendicular to the stream or direction of flow.

Crown of Pipe. The elevation of top of pipe.

Cubic Feet Per Second (CFS). Used to describe the amount of flow passing a given point in a stream channel. One cubic foot per second is equivalent to approximately 7.5 gallons per second.

Culvert. A closed conduit used for the conveyance of surface drainage water under a roadway, railroad, canal or other impediment.

Curve Number (CN). The Soil Conservation Service index that represents the combined hydrologic effect of soil, land use, land cover, hydrologic condition and antecedent runoff condition.

Dam. A barrier to confine or impound water for storage or diversion, to prevent gully erosion, or to retain soil, sediment, or other debris.

Damage. Measurable rise in flood heights on buildings currently subject to flooding, flooding of buildings currently not subject to flooding and increases in volume or velocity to the point where the rate of land lost to erosion and scour is substantially increased.

Datum. Any level surface to which elevations are referred, usually Mean Sea Level.

Dechlorinated swimming pool discharge. Chlorinated water that has either sat idle for seven (7) days following chlorination prior to discharge to the MS4 conveyance, or, by analysis, does not contain detectable concentrations (less than five-hundredths (0.05) milligram per liter) of chlorinated residual.

Depressional Storage Areas. Non-riverine depressions in the earth where stormwater collects. The volumes are often referred to in units of acre-feet.

Design Storm. A selected storm event, described in terms of the probability of occurring once within a given number of years, for which drainage or flood control improvements are designed and built.

Detention Basin. A facility constructed or modified to restrict the flow of stormwater to a prescribed maximum rate, and to detain concurrently the excess waters that accumulate behind the outlet.

Detention Facility. A facility designed to detain a specified amount of stormwater runoff assuming a specified release rate. The volumes are often referred to in units of acre-feet.

Detention Storage. The temporary detaining of storage of stormwater in storage facilities, on rooftops, in streets, parking lots, school yards, parks, open spaces or other areas under predetermined and controlled conditions, with the rate of release regulated by appropriately installed devices.

Detention Time. The theoretical time required to displace the contents of a tank or unit at a given rate of discharge (volume divided by rate of discharge).

Detention. Managing stormwater runoff by temporary holding and controlled release.

Detritus. Dead or decaying organic matter; generally contributed to stormwater as fallen leaves and sticks or as dead aquatic organisms.

Developer. Any person financially responsible for construction activity, or an owner of property who sells or leases, or offers for sale or lease, any lots in a subdivision.

Development. Any man-made change to improved or unimproved real estate including but not limited to:

1. Construction, reconstruction, or placement of a building or any addition to a building;
2. Construction of flood control structures such as levees, dikes, dams or channel improvements;
3. Construction or reconstruction of bridges or culverts;
4. Installing a manufactured home on a site, preparing a site for a manufactured home, or installing a recreational vehicle on a site for more than hundred eight (180) days;
5. Installing utilities, erection of walls, construction of roads, or similar projects;
6. Mining, dredging, filling, grading, excavation, or drilling operations;
7. Storage of materials; or
8. Any other activity that might change the direction, height, or velocity of flood or surface waters.

“Development” does not include activities such as the maintenance of existing buildings and facilities such as painting, re-roofing, resurfacing roads, or gardening, plowing and similar agricultural practices that do not involve filling, grading, excavation, or the construction of permanent buildings.

Direct Release. A method of stormwater management where runoff from a part or the entire development is released directly to the receiving stream without providing detention.

Discharge. Usually the rate of water flow. A volume of fluid passing a point per unit time commonly expressed as cubic feet per second, cubic meters per second, gallons per minute, or millions of gallons per day.

Disposal. The discharge, deposit, injection, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that the solid waste or hazardous waste, or any constituent of the waste, may enter the environment, be emitted into the air, or be discharged into any waters, including

Ditch. A man-made, open drainageway in or into which excess surface water or groundwater drained from land, stormwater runoff, or floodwaters flow either continuously or intermittently.

Drain. A buried slotted or perforated pipe or other conduit (subsurface drain) or a ditch (open drain) for carrying off surplus groundwater or surface water.

Drainage Area. The area draining into a stream at a given point. It may be of different sizes for surface runoff, subsurface flow and base flow, but generally the surface runoff area is considered as the drainage area.

Drainage Classification (soil). As a natural condition of the soil, drainage refers to both the frequency and duration of periods when the soil is free of saturation. Soil drainage conditions are defined as:

- *Well-drained*--Excess water drains away rapidly, and no mottling occurs within 36 in. of the surface.
- *Moderately well drained*--Water is removed from the soil somewhat slowly resulting in small but significant periods of wetness, and mottling occurs between 18 and 36 in.
- *Poorly drained*--Water is removed so slowly that it is wet for a large part of the time, and mottling occurs between 0 and 8 in.
- *Somewhat poorly drained*--Water is removed from the soil slowly enough to keep it wet for significant periods but not all of the time, and mottling occurs between 8 to 18 in.
- *Very poorly drained*--Water is removed so slowly that the water table remains at or near the surface for the greater part of the time; there may also be periods of surface ponding; the soil has a black to gray surface layer with mottles up to the surface.

Drainage. The removal of excess surface water or groundwater from land by means of ditches or subsurface drains. Also see Natural drainage.

Drop Manhole. Manhole having a vertical drop pipe connecting the inlet pipe to the outlet pipe. The vertical drop pipe shall be located immediately outside the manhole.

Dry Well. A type of infiltration practice that allows stormwater runoff to flow directly into the ground via a bored or otherwise excavated opening in the ground surface.

Dry-Bottom Detention Basin. A basin designed to be completely dewatered after having provided its planned detention of runoff during a storm event.

Duration. The time period of a rainfall event.

Earth Embankment. A man-made deposit of soil, rock, or other material often used to form an impoundment.

Elevation Certificate. A form published by the Federal Emergency Management Agency that is used to certify the 100-year or base flood elevation and the lowest elevation of usable space to which a building has been constructed.

Elevation Reference Mark (ERM). Elevation benchmark tied to the National Geodetic Vertical Datum of 1929 and identified during the preparation of a Flood Insurance Study prepared for the Federal Emergency Management Agency.

Emergency Spillway. Usually a vegetated earth channel used to safely convey flood discharges around an impoundment structure.

Energy Dissipater. A device to reduce the energy of flowing water.

Environment. The sum total of all the external conditions that may act upon a living organism or community to influence its development or existence.

Erosion and sediment control measure. A practice, or a combination of practices, to control erosion and resulting sedimentation. and/or off-site damages.

Erosion and sediment control system. The use of appropriate erosion and sediment control measures to minimize sedimentation by first reducing or eliminating erosion at the source and then as necessary, trapping sediment to prevent it from being discharged from or within a project site.

Erosion control plan. A written description and site plan of pertinent information concerning erosion control measures designed to meet the requirements of the Ordinance or these Technical Standards.

Erosion. The wearing away of the land surface by water, wind, ice, gravity, or other geological agents. The following terms are used to describe different types of water erosion:

- *Accelerated erosion*--Erosion much more rapid than normal or geologic erosion, primarily as a result of the activities of man.
- *Channel erosion* --An erosion process whereby the volume and velocity of flow wears away the bed and/or banks of a well-defined channel.
- *Gully erosion* --An erosion process whereby runoff water accumulates in narrow channels and, over relatively short periods, removes the soil to considerable depths, ranging from 1-2 ft. to as much as 75-100 ft.
- *Rill erosion*--An erosion process in which numerous small channels only several inches deep are formed; occurs mainly on recently disturbed and exposed soils (see Rill).
- *Splash erosion*--The spattering of small soil particles caused by the impact of raindrops on wet soils; the loosened and spattered particles may or may not be subsequently removed by surface runoff.
- *Sheet erosion*--The gradual removal of a fairly uniform layer of soil from the land surface by runoff water.

Extraterritorial Jurisdiction (ETJ). Areas located outside the corporate limits of a community over which the community has statutory development authority.

Farm or Field Tile. A pipe installed in an agricultural area to allow subsurface drainage of farmland for the purpose of agricultural production.

FEMA. The Federal Emergency Management Agency.

Filter Strip. Usually a long, relatively narrow area (usually, 20-75 feet wide) of undisturbed or planted vegetation used near disturbed or impervious surfaces to filter stormwater pollutants for the protection of watercourses, reservoirs, or adjacent properties.

Final stabilization. The establishment of permanent vegetative cover or the application of a permanent nonerosive material to areas where all land disturbing activities have been completed and no additional land disturbing activities are planned under the current permit.

Floatable. Any solid waste that will float on the surface of the water.

Flood (or Flood Waters). A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow, the unusual and rapid accumulation, or the runoff of surface waters from any source.

Flood Boundary and Floodway Map (FBFM). A map prepared by the Federal Emergency Management Agency the depicts the FEMA designated floodways within a community. This map also includes delineation of the 100-year and 500-year floodplain boundaries and the location of the Flood Insurance Study cross-sections.

Flood Crest. The maximum stage or elevation reached or expected to be reached by the waters of a specific flood at a given time.

Flood Duration. The length of time a stream is above flood stage or overflowing its banks.

Flood Easement. Easement granted to identify areas inundated by the 100-year flood and prohibit or severely restrict development activities.

Flood Elevation. The elevation at all locations delineating the maximum level of high waters for a flood of given return period.

Flood Fighting. Actions taken immediately before or during a flood to protect human life and to reduce flood damages such as evacuation, emergency sandbagging and diking.

Flood Forecasting. The process of predicting the occurrence, magnitude and duration of an imminent flood through meteorological and hydrological observations and analysis.

Flood Frequency. A statistical expression of the average time period between floods equaling or exceeding a given magnitude. For example, a 100-year flood has a magnitude expected to be equaled or exceeded on the average of once every hundred years; such a flood has a one-percent chance of being equaled or exceeded in any given year. Often used interchangeably with "recurrence interval".

Flood Hazard Area. Any floodplain, floodway, floodway fringe, or any combination thereof which is subject to inundation by the regulatory flood; or any flood plain as delineated by Zone X on a Flood Hazard Boundary Map.

Flood Hazard Boundary Map (FHBM). A map prepared by the Federal Emergency Management Agency that depicts Special Flood Hazard Areas as a Zone A within a community. There are no study text, base flood elevations, or floodways associated with this map.

Flood Insurance Rate Map (FIRM). A map prepared by the Federal Emergency Management Agency that depicts Special Flood Hazard Areas within a community. This map also includes the 100-year or Base Flood Elevation at various locations along the watercourses. More recent versions of the FIMR may also show the FEMA designated floodway boundaries and the location of the Flood Insurance Study cross-sections.

Flood Insurance Study (FIS). A study prepared by the Federal Emergency Management agency to assist a community participating in the National Flood Insurance Program in its application of the program regulations. The study consists of a text which contains community background information with respect to flooding, a floodway data table, summary of flood discharges, flood profiles, a Flood Insurance Rate Map, and a Flood Boundary and Floodway Map.

Flood Profile. A graph showing the relationship of water surface elevation to a specific location, the latter generally expressed as distance above the mouth of a stream of water flowing in a channel. It is

generally drawn to show surface elevation for the crest or a specific magnitude of flooding, but may be prepared for conditions at any given time or stage.

Flood Protection Grade (FPG). The elevation of the regulatory or 100-year flood plus two (2) feet at any given location in the Special Flood Hazard Area or 100-year floodplain.

Flood Protection Grade. The elevation of the lowest floor of a building, including the basement, which shall be two feet above the elevation of the regulatory flood.

Flood Resistant Construction (Flood Proofing). Additions, changes or adjustments to structures or property that are designed to reduce or eliminate the potential for flood damage.

Flood Storage Areas. Depressions, basins, or other areas that normally stand empty or partially empty, but fill with rainfall runoff during storms to hold the runoff and reduce downstream flow rates. The volumes are often referred to in units or acre-feet.

Floodplain Management. The operation of a program of corrective and preventive measures for reducing flood damage, including but not limited to flood control projects, floodplain land use regulations, flood proofing of buildings, and emergency preparedness plans.

Floodplain Regulations. General term applied to the full range of codes, ordinances and other regulations relating to the use of land and construction within floodplain limits. The term encompasses zoning ordinances, subdivision regulations, building and housing codes, encroachment laws and open area (space) regulations.

Floodplain. The channel proper and the areas adjoining the channel which have been or hereafter may be covered by the regulatory or 100-year flood. Any normally dry land area that is susceptible to being inundated by water from any natural source. The floodplain includes both the floodway and the floodway fringe districts.

Floodway Fringe. That portion of the flood plain lying outside the floodway, which is inundated by the regulatory flood.

Floodway. The channel of a river or stream and those portions of the floodplains adjoining the channel which are reasonably required to efficiently carry and discharge the peak flow of the regulatory flood of any river or stream.

Footing Drain. A drain pipe installed around the exterior of a basement wall foundation to relieve water pressure caused by high groundwater elevation.

Forebay (or Sediment Forebay). A small pond placed in front of a larger retention/detention structure such as a wet pond, dry pond, or wetland to intercept and concentrate a majority of sediment that is coming into the system before it reaches the larger structure.

Freeboard. An increment of height added to the base flood elevation to provide a factor of safety for uncertainties in calculations, unknown local conditions, wave actions and unpredictable effects such as those caused by ice or debris jams. (See Flood Protection Grade).

French Drain. A drainage trench backfilled with a coarse, water-transmitting material; may contain a perforated pipe.

Gabion. An erosion control structure consisting of a wire cage or cages filled with rocks.

Garbage. All putrescible animal solid, vegetable solid, and semisolid wastes resulting from the processing, handling, preparation, cooking, serving, or consumption of food or food materials.

Geographical Information System. A computer system capable of assembling, storing, manipulation, and displaying geographically referenced information. This technology can be used for resource management and development planning.

Geotextile Fabric. A woven or non-woven, water-permeable synthetic material used to trap sediment particles, prevent the clogging of aggregates with fine grained soil particles, or as a separator under road aggregate.

Geotextile Liner. A synthetic, impermeable fabric used to seal impoundments against leaks.

Global Positioning System. A system that provides specially coded satellite signals that is processed by a receiver, which determines position, velocity, and time. The system is funded and controlled by the U.S. Department of Defense.

Grade. (1) The inclination or slope of a channel, canal, conduit, etc., or natural ground surface usually expressed in terms of the percentage the vertical rise (or fall) bears to the corresponding horizontal distance. (2) The finished surface of a canal bed, roadbed, top of embankment, or bottom of excavation; any surface prepared to a design elevation for the support of construction, such as paving or the laying of a conduit. (3) To finish the surface of a canal bed, roadbed, top of embankment, or bottom of excavation, or other land area to a smooth, even condition.

Grading. The cutting and filling of the land surface to a desired slope or elevation.

Grass. A member of the botanical family Graminae, characterized by blade-like leaves that originate as a sheath wrapped around the stem.

Grassed swale. A type of vegetative practice used to filter stormwater runoff via a vegetated, shallow-channel conveyance.

Grassed Waterway. A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses and used to conduct surface water from an area.

Ground Cover (horticulture). Low-growing, spreading plants useful for low-maintenance landscape areas.

Groundwater Recharge. The infiltration of water into the earth. It may increase the total amount of water stored underground or only replenish supplies depleted through pumping or natural discharge.

Groundwater. Accumulation of underground water, natural or artificial. The term does not include

Habitat. The environment in which the life needs of a plant or animal are supplied.

Hard Surface. See “Impervious Surface.”

High Water. Maximum designed permitted, or regulated water level for an impoundment.

Household Hazardous Waste. Solid waste generated by households that is ignitable, toxic, reactive, corrosive, or otherwise poses a threat to human health or the environment.

Hot Spot Development. Projects involving land uses considered to be high pollutant producers such as vehicle service and maintenance facilities, vehicle salvage yards and recycling facilities, vehicle and equipment cleaning facilities, fleet storage areas for buses, trucks, etc., industrial/commercial or any hazardous waste storage areas or areas that generate such wastes, industrial sites, restaurants and convenience stores, any activity involving chemical mixing or loading/unloading, outdoor liquid container

storage, public works storage areas, commercial container nurseries, and some high traffic retail uses characterized by frequent vehicle turnover.

Hydraulic Grade Line (HGL). For Channel flow, the HGL is equal to the water surface whereas for pressure flow it is the piezometric surface.

Hydraulics. A branch of science that deals with the practical application of the mechanics of water movement. A typical hydraulic study is undertaken to calculate water surface elevations.

Hydrodynamic Loads. Forces imposed on structures by floodwaters due to the impact of moving water on the upstream side of the structure, drag along its sides, and eddies or negative pressures on its downstream side.

Hydrograph. For a given point on a stream, drainage basin, or a lake, a graph showing either the discharge, stage (depth), velocity, or volume of water with respect to time.

Hydrologic Unit Code. A numeric United States Geologic Survey code that corresponds to a watershed area. Each area also has a text description associated with the numeric code.

Hydrology. The science of the behavior of water in the atmosphere, on the surface of the earth, and underground. A typical hydrologic study is undertaken to compute flow rates associated with specified flood events.

Hydrometeorologic. Water-related meteorologic data such as rainfall or runoff.

Hydrostatic Loads. Those loads or pressures resulting from the static mass of water at any point of floodwater contact with a structure. They are equal in all direction and always act perpendicular to the surface on which they are applied. Hydrostatic loads can act vertically on structural members such as floors, decks and roofs, and can act laterally on upright structural members such as walls, piers, and foundations.

IDNR. Indiana Department of Natural Resources.

Illicit Discharge. Any discharge to a conveyance that is not composed entirely of stormwater except naturally occurring floatables, such as leaves or tree limbs.

Impact Areas. Areas defined or mapped that are unlikely to be easily drained because of one or more factors including but not limited to any of the following: soil type, topography, land where there is not adequate outlet, a floodway or floodplain, land within 75 feet of each bank of any regulated drain or within 75 feet from the centerline of any regulated tile ditch.

Impaired Waters. Waters that do not or are not expected to meet applicable water quality standards, as included on IDEM's CWA Section 303(d) List of Impaired Waters.

Impervious surface. Surfaces, such as pavement and rooftops, which prevent the infiltration of stormwater into the soil.

Individual building lot. A single parcel of land within a multi-parcel development.

Individual lot operator. A contractor or subcontractor working on an individual lot.

Individual lot owner. A person who has financial control of construction activities for an individual lot.

INDOT. Indiana Department of Transportation. Generally used here to refer to specifications contained in the publication "INDOT Standard Specifications."

Infiltration practices. Any structural BMP designed to facilitate the percolation of run-off through the soil to ground water. Examples include infiltration basins or trenches, dry wells, and porous pavement.

Infiltration. Passage or movement of water into the soil.

Infiltration Swales. A depressed earthen area that is designed to promote infiltration.

Inlet. An opening into a storm drain system for the entrance of surface stormwater runoff, more completely described as a storm drain inlet.

Intermittent Stream.

Invert. The inside bottom of a culvert or other conduit.

Junction Chamber. A converging section of conduit, usually large enough for a person to enter, used to facilitate the flow from one or more conduits into a main conduit.

Land Surveyor. A person licensed under the laws of the State of Indiana to practice land surveying.

Land-disturbing Activity. Any man-made change of the land surface, including removing vegetative cover that exposes the underlying soil, excavating, filling, transporting and grading.

Larger common plan of development or sale. A plan, undertaken by a single project site owner or a group of project site owners acting in concert, to offer lots for sale or lease; where such land is contiguous, or is known, designated, purchased or advertised as a common unit or by a common name, such land shall be presumed as being offered for sale or lease as part of a larger common plan. The term also includes phased or other construction activity by a single entity for its own use.

Lateral Storm Sewer. A drain that has inlets connected to it but has no other storm drain connected.

Life Cycle Cost. Cost based on the total cost incurred over the system life including research, development, testing, production, construction, operation, and maintenance. Costs are normally determined on present worth or equivalent annual cost basis.

Low Entry Elevation. The elevation in a structure where overbank flooding can enter the structure.

Lowest Adjacent Grade. The elevation of the lowest grade adjacent to a structure, where the soil meets the foundation around the outside of the structure (including structural members such as basement walkout, patios, decks, porches, support posts or piers, and rim of the window well.

Lowest Floor. Refers to the lowest of the following:

1. The top of the basement floor;
2. The top of the garage floor, if the garage is the lowest level of the building;
3. The top of the first floor of buildings constructed on a slab or of buildings elevated on pilings or constructed on a crawl space with permanent openings; or
4. The top of the floor level of any enclosure below an elevated building where the walls of the enclosure provide any resistance to the flow of flood waters unless:

    a] The walls are designed to automatically equalize the hydrostatic flood forces on the walls by allowing for the entry and exit of flood waters, by providing a minimum of two

opening (in addition to doorways and windows) having a total area of one (1) square foot for every two (2) square feet of enclosed area subject to flooding. The bottom of all such openings shall be no higher than one (1) foot above grade.

b] Such enclosed space shall be usable only for the parking of vehicles or building access.

Major Drainage System. Drainage system carrying runoff from an area of one or more square miles.

Manhole. Storm drain structure through which a person may enter to gain access to an underground storm drain or enclosed structure.

Manning Roughness Coefficient or Manning's "n" Value. A dimensionless coefficient ("n") used in the Manning's equation to account for channel wall frictional losses in steady uniform flow.

Measurable storm event. A precipitation event that results in a total measured precipitation accumulation equal to, or greater than, one-half (0.5) inch of rainfall.

Minimum Control Measure. Minimum measures required by the NPDES Phase II program. The six (6) MCMs are: Public education and outreach, Public participation and involvement, Illicit discharge detection and elimination, Construction site runoff control, Post-construction runoff control, and Pollution prevention and good housekeeping.

Minor Drainage Systems. Drainage system carrying runoff from an area of less than one square mile.

Mulch. A natural or artificial layer of plant residue or other materials covering the land surface which conserves moisture, holds soil in place, aids in establishing plant cover, and minimizes temperature fluctuations.

Multi-Family. Any structure which contains three or more dwelling units. A dwelling unit is any structure, or part of a structure, which is constructed to a house a family.

Municipal Separate Storm Sewers. An MS4 meets all the following criteria: (1) is a conveyance or system of conveyances owned by the state, county, city, town, or other public entity; (2) discharges to waters of the U.S.; (3) is designed or used for collecting or conveying stormwater; (4) is not a combined sewer; and, (5) is not part of a Publicly Owned Treatment Works (POTW).

Municipal, state, federal, or institutional refueling area. An operating gasoline or diesel fueling area whose primary function is to provide fuel to either municipal, state, federal, or institutional equipment or vehicles.

Mutual Drain. A drain that: (1) Is located on two or more tracts of land that are under different ownership; (2) was established by the mutual consent of all the owners; and (3) was not established under or made subject to any drainage statute.

National Flood Insurance Program (NFIP). The NFIP is a Federal program enabling property owners to purchase flood insurance. The Federal Emergency Management Agency administers the NFIP in communities throughout the Unites States. The NFIP is based on an agreement between local communities and the Federal government which states that if a community will implement floodplain management measures to reduce future flood risks to new construction and substantially improved structures in flood hazard areas, the Federal government will make flood insurance available within the community as a financial protection against flood losses that do occur.

National Geodetic Vertical Datum of 1929. The nationwide, Federal Elevation datum used to reference topographic elevations to a known value.

National Pollution Discharge Elimination System (NPDES). A permit developed by the U.S. EPA through the Clean Water Act. In Indiana, the permitting process has been delegated to IDEM. This permit covers aspects of municipal stormwater quality.

Natural Drainage. The flow patterns of stormwater run-off over the land in its pre-development state.

Nonagricultural land use. Commercial use of land for the manufacturing and wholesale or retail sale of goods or services, residential or institutional use of land intended primarily to shelter people, highway use of land including lanes, alleys, and streets, and other land uses not included in agricultural land use.

Nonpoint Source Pollution. Pollution that enters a water body from diffuse origins on the watershed and does not result from discernable, confined, or discrete conveyances.

Normal Depth. Depth of flow in an open conduit during uniform flow for the given conditions.

North American Vertical Datum of 1988 (NAVD 1988). The nationwide, Federal Elevation datum used to reference topographic elevations to a known value.

Nutrient(s). (1) A substance necessary for the growth and reproduction of organisms. (2) In water, those substances (chiefly nitrates and phosphates) that promote growth of algae and bacteria.

Off-site. Everything not located at or within a particular site.

Off-site Land Areas. Those areas that by virtue of existing topography naturally shed surface water onto or through the developing property.

100-Year Frequency Flood. See “regulatory flood”.

On-Site. Located within the controlled or urbanized area where runoff originates.

Open Drain. A natural watercourse or constructed open channel that conveys drainage water.

Open Space. Any land area devoid of any disturbed or impervious surfaces created by industrial, commercial, residential, agricultural, or other manmade activities.

Orifice. A device which controls the rate of flow from a detention basin.

Outfall scouring. The deterioration of a streambed or lakebed from an outfall discharge to an extent that the excessive settling of solid material results and suitable aquatic habitat is diminished.

Outfall. The point, location, or structure where a pipe or open drain discharges to a receiving body of water.

Outlet. The point of water disposal from a stream, river, lake, tidewater, or artificial drain.

Overland Flow. Consists of sheet flow, shallow concentrated flow and channel flow.

Peak Discharge (or Peak Flow). The maximum instantaneous flow from a given storm condition at a specific location.

Percolation. The movement of water through soil.

Perennial Stream. A stream that maintains water in its channel throughout the year.

Permanent stabilization. The establishment, at a uniform density of seventy percent (70%) across the disturbed area, of vegetative cover or permanent non-erosive material that will ensure the resistance of the soil to erosion, sliding, or other movement.

Permeability (soil). The quality of a soil that enables water or air to move through it. Usually expressed in inches per hour or inches per day.

Pervious. Allowing movement of water.

Pesticides. Chemical compounds used for the control of undesirable plants, animals, or insects. The term includes insecticides, herbicides, algicides, rodenticides, nematicides, fungicides, and growth regulators.

pH. A numerical measure of hydrogen ion activity, the neutral point being 7.0. All pH values below 7.0 are acid, and all above 7.0 are alkaline.

Phasing of construction. Sequential development of smaller portions of a large project site, stabilizing each portion before beginning land disturbance on subsequent portions, to minimize exposure of disturbed land to erosion.

Phosphorus (available). Inorganic phosphorus that is readily available for plant growth.

Piping. The formation of "pipes" by underground erosion. Water in the soil carries the fine soil particles away, and a series of eroded tubes or tunnels develop. These openings will grow progressively larger and can cause a dam failure.

Planimetric Data. Horizontal measurements involving distances or dimensions on a diagram, map, Plat of Survey or topographic map. Normally in units of feet.

Plat of Survey. A scaled diagram showing boundaries of a tract of land or subdivision. This may constitute a legal description of the land and be used in lieu of a written description.

Point Source. Any discernible, confined, and discrete conveyance including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, or container from which pollutants are or maybe discharged (P.L. 92-500, Section 502[14]).

Pollutant of concern. Any pollutant that has been documented via analytical data as a cause of impairment in any waterbody.

Porosity. The volume of pore space in soil or rock.

Porous pavement. A type of infiltration practice to improve the quality and reduce the quantity of stormwater run-off via the use of manmade, pervious pavement which allows run-off to percolate through the pavement and into underlying soils

Private Drain. A drain that: (1) Is located on land owned by one person or by two or more persons jointly; and (2) was not established under or made subject to any drainage statute.

Professional Engineer. A person licensed under the laws of the State of Indiana to practice professional engineering.

Programmatic Indicator. Any data collected by an MS4 entity that is used to indicate implementation of one (1) or more minimum control measures.

Project site owner. The person required to submit a stormwater permit application, and required to comply with the terms of the Ordinance or these Technical Standards, including a developer or a person who has financial and operational control of construction activities, and project plans and specifications, including the ability to make modifications to those plans and specifications.

Project site. The entire area on which construction activity is to be performed.

Probable Maximum Flood. The most severe flood that may be expected from a combination of the most critical meteorological and hydrological conditions that are reasonably possible in the drainage basin. It is used in designing high-risk flood protection works and citing of structures and facilities that shall be subject to almost no risk of flooding. The probable maximum flood is usually much larger than the 100-year flood.

Publically Owned Treatment Works (POTW). A municipal operation that breaks down and removes contaminants in the wastewater prior to discharging to a stream through primary and/or secondary treatment systems.

Qualified professional. An individual who is trained and experienced in stormwater treatment techniques and related fields as may be demonstrated by state registration, professional certification, experience, or completion of coursework that enable the individual to make sound, professional judgments regarding stormwater control or treatment and monitoring, pollutant fate and transport, and drainage planning.

Radius of Curvature. Length of radius of a circle used to define a curve.

Rain garden. A vegetative practice used to alter impervious surfaces, such as roofs, into pervious surfaces for absorption and treatment of rainfall.

Rainfall Intensity. The rate at which rain is falling at any given instant, usually expressed in inches per hour.

Reach. Any length of river, channel or storm drain.

Receiving Stream or Receiving Water. The body of water into which runoff or effluent is discharged. The term does not include private drains, unnamed conveyances, retention and detention basins, or constructed wetlands used as treatment.

Recharge. Replenishment of groundwater reservoirs by infiltration and transmission from the outcrop of an aquifer or from permeable soils.

Recurrence Interval. A statistical expression of the average time between floods equaling or exceeding a given magnitude.

Redevelopment. Development on a previously developed site.

Regional Pond. A detention/retention basin sized to detain/retain the runoff from the entire watershed, on-site and off-site, tributary to the pond's outlet.

Regulated Area. The following areas within the City of Jeffersonville.

Regulated Drain. A drain subject to the provisions of the Indiana Drainage Code, I.C.-36-9-27.

Regulatory or 100-Year Flood. The discharge or elevation associated with the 100-year flood as calculated by a method and procedure which is acceptable to and approved by the Indiana Department of Natural Resources and the Federal Emergency Management Agency. The "regulatory flood" is also known as the "base flood".

Regulatory Floodway. See Floodway.

Release Rate - The amount of stormwater release from a stormwater control facility per unit of time.

Reservoir. A natural or artificially created pond, lake or other space used for storage, regulation or control of water. May be either permanent or temporary. The term is also used in the hydrologic modeling of storage facilities.

Retail gasoline outlet. An operating gasoline or diesel fueling facility whose primary function is the resale of fuels. The term applies to facilities that create five thousand (5,000) or more square feet of impervious surfaces, or generate an average daily traffic count of one hundred (100) vehicles per one thousand (1,000) square feet of land area.

Retention basin. A type of storage practice, that has no positive outlet, used to retain stormwater run-off for an indefinite amount of time. Runoff from this type of basin is removed only by infiltration through a porous bottom or by evaporation.

Retention. The storage of stormwater to prevent it from leaving the development site. May be temporary or permanent.

Retention Facility. A facility designed to completely retain a specified amount of stormwater runoff without release except by means of evaporation, infiltration or pumping. The volumes are often referred to in units of acre-feet.

Return Period - The average interval of time within which a given rainfall event will be equaled or exceeded once. A flood having a return period of 100 years has a one percent probability of being equaled or exceeded in any one year.

Revetment. Facing of stone or other material, either permanent or temporary, placed along the edge of a stream to stabilize the bank and protect it from the erosive action of the stream. Also see Revetment riprap.

Right-of-Way for a County Drain. The statutory right of way as defined by Indiana Code for a regulated drain.

Riparian habitat. A land area adjacent to a waterbody that supports animal and plant life associated with that waterbody.

Riparian zone. Of, on, or pertaining to the banks of a stream, river, or pond.

Riprap. Broken rock, cobble, or boulders placed on earth surfaces, such as the face of a dam or the bank of a stream, for protection against the action of water (waves). Revetment riprap is material graded such that: (1) no individual piece weighs more than 120 lbs. and (2) 90-100% will pass through a 12-inch sieve, 20-60% through a 6-inch sieve, and not more than 10% through a 12-inch sieve.

River Restoration. Restoring the channel of a stream or ditch to its perceived original, non-obstructed capacity by means of clearing & snagging, obstruction removal, and inexpensive streambank protection measures. The term "restoration", as noted, does not necessarily imply restoration or improvement of water quality or habitat within the channel or its adjacent area.

Riverine. Relating to, formed by, or resembling a stream (including creeks and rivers).

Runoff Coefficient - A decimal fraction relating the amount of rain which appears as runoff and reaches the storm drain system to the total amount of rain falling. A coefficient of 0.5 implies that 50 percent of the rain falling on a given surface appears as stormwater runoff.

Runoff. That portion of precipitation that flows from a drainage area on the land surface, in open channels, or in stormwater conveyance systems.

Sand. (1) Soil particles between 0.05 and 2.0 mm in diameter. (2) A soil textural class inclusive of all soils that are at least 70% sand and 15% or less clay.

Sanitary Backup. The condition where a sanitary sewer reaches capacity and surcharges into the lowest area.

Scour. The clearing and digging action of flowing water.

Sediment. Solid material (both mineral and organic) that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface.

Sediment Forebay. See "Forebay".

Sedimentation. The process that deposits soils, debris and other unconsolidated materials either on the ground surfaces or in bodies of water or watercourses.

Seepage. The passage of water or other fluid through a porous medium, such as the passage of water through an earth embankment or masonry wall.

Sensitive Water. A water body in need of priority protection or remediation base on its:

providing habitat for threatened or endangered species,

usage as a public water supply intake,

relevant community value,

usage for full body contact recreation,

exceptional use classification as found in 327 IAC 2-1-11(b), outstanding state resource water classification as found in 327 IAC 2-1-2(3) and 327 IAC 2-1.5-19(b).

Settling Basin. An enlargement in the channel of a stream to permit the settling of debris carried in suspension.

Silt Fence. A fence constructed of wood or steel supports and either natural (e.g. burlap) or synthetic fabric stretched across area of non-concentrated flow during site development to trap and retain on-site sediment due to rainfall runoff.

Silt. (1) Soil fraction consisting of particles between 0.002 and 0.05 mm in diameter. (2) A soil textural class indicating more than 80% silt.

Siphon - A closed conduit or portion of which lies above the hydraulic grade line, resulting in a pressure less than atmospheric and requiring a vacuum within the conduit to start flow. A siphon utilizes atmospheric pressure to effect or increase the flow of water through a conduit. An inverted siphon is used to carry stormwater flow under an obstruction such as a sanitary sewer.

Site. The entire area included in the legal description of the land on which land disturbing activity is to be performed.

Slope. Degree of deviation of a surface from the horizontal, measured as a numerical ratio or percent. Expressed as a ratio, the first number is commonly the horizontal distance (run) and the second is the vertical distance (rise)--e.g., 2:1. However, the preferred method for designation of slopes is to clearly identify the horizontal (H) and vertical (V) components (length (L) and Width (W) components for horizontal angles). Also note that according to international standards (Metric), the slopes are presented as the vertical or width component shown on the numerator--e.g., 1V:2H. Slope expressions in the Ordinance or these Technical Standards follow the common presentation of slopes--e.g., 2:1 with the metric presentation shown in parenthesis--e.g., (1V:2H). Slopes can also be expressed in "percents". Slopes given in percents are always expressed as (100*V/H) --e.g., a 2:1 (1V:2H) slope is a 50% slope.

Soil and Water Conservation District. A public organization created under state law as a special-purpose district to develop and carry out a program of soil, water, and related resource conservation, use, and development within its boundaries. A subdivision of state government with a local governing body, established under IC 14-32.

Soil. The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants.

Solid Waste. Any garbage, refuse, debris, or other discarded material.

Special Flood Hazard Area. An area that is inundated during the 100-Year flood.

Spill. The unexpected, unintended, abnormal, or unapproved dumping, leakage, drainage, seepage, discharge, or other loss of petroleum, hazardous substances, extremely hazardous substances, or objectionable substances. The term does not include releases to impervious surfaces when the substance does not migrate off the surface or penetrate the surface and enter the soil.

Spillway - A waterway in or about a hydraulic structure, for the escape of excess water.

Standard Project Flood. A term used by the U.S. Army Corps of Engineers to designate a flood that may be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonable characteristics of the geographical area in which the drainage basin is located, excluding extremely rare combinations. The peak flow for a standard project flood is generally 40 – 60 percent of the probable maximum flood for the same location.

Stilling Basin - A basin used to slow water down or dissipate its energy.

Storage practices. Any structural BMP intended to store or detain stormwater and slowly release it to receiving waters or drainage systems. The term includes detention and retention basins.

Storm drain signing. Any marking procedure that identifies a storm sewer inlet as draining directly to a receiving waterbody so as to avoid dumping pollutants. The procedures can include painted or cast messages and adhesive decals.

Storm Duration. The length of time that water may be stored in any stormwater control facility, computed from the time water first begins to be stored.

Storm Event. An estimate of the expected amount of precipitation within a given period of time. For example, a 10-yr. frequency, 24-hr. duration storm event is a storm that has a 10% probability of occurring in any one year. Precipitation is measured over a 24-hr. period.

Storm Frequency. The time interval between major storms of predetermined intensity and volumes of runoff--e.g., a 5-yr., 10-yr. or 20-yr. storm.

Storm Sewer. A closed conduit for conveying collected stormwater, while excluding sewage and industrial wastes. Also called a storm drain.

Stormwater Drainage System. All means, natural or man-made, used for conducting stormwater to, through or from a drainage area to any of the following: conduits and appurtenant features, canals, channels, ditches, storage facilities, swales, streams, culverts, streets and pumping stations.

Stormwater Facility. All ditches, channels, conduits, levees, ponds, natural and manmade impoundments, wetlands, tiles, swales, sewers and other natural or artificial means of draining surface and subsurface water from land.

Stormwater Management System. A collection of structural and non-structural practices and infrastructure designed to manage stormwater on a site. This system may include but is not limited to erosion control measures, storm drainage infrastructure, detention/retention facilities, and stormwater quality BMP's.

Stormwater Pollution Prevention Plan. A plan developed to minimize the impact of stormwater pollutants resulting from construction activities.

Stormwater Quality Management Plan. A comprehensive written document that addresses stormwater runoff quality.

Stormwater Quality Measure. A practice, or a combination of practices, to control or minimize pollutants associated with stormwater runoff.

Stormwater runoff. The water derived from rains falling within a tributary basin, flowing over the surface of the ground or collected in channels or conduits.

Stormwater. Water resulting from rain, melting or melted snow, hail, or sleet.

Stream Gauging. The quantitative determination of streamflow using gauges, current meters, weirs, or other measuring instruments at selected locations (see Gauging station').

Stream Length. The length of a stream or ditch, expressed in miles, from the confluence of the stream or ditch with the receiving stream to the upstream extremity of the stream or ditch, as indicated by the solid or dashed, blue or purple line depicting the stream or ditch on the most current edition of the seven and one-half (72) minute topographic quadrangle map published by the United States Geological Survey, measured along the meanders of the stream or ditch as depicted on the map.

Stream. See Intermittent stream, Perennial stream, Receiving stream.

Streambanks. The usual boundaries (not the flood boundaries) of a stream channel. Right and left banks are named facing downstream.

Strip development. A multi-lot project where building lots front on an existing road.

Structure. Refers to a structure that is principally above ground and is enclosed by walls and a roof. The term includes but is not limited to, a gas or liquid storage tank, a manufactured home or a prefabricated building, and recreational vehicles to be installed on a site for more than 180 days.

Structural Engineer. A person licensed under the laws of the State of Indiana to engage in the designing or supervising of construction, enlargement or alteration of structures or any part thereof.

Structural Floodplain. Management Measures. Those physical or engineering measures employed to modify the way foods behave, (e.g., dams, dikes, levees, channel enlargements and diversions).

Subarea/Sub-basin. Portion of a watershed divided into homogenous drainage units which can be modeled for purposes of determining runoff rates. The subareas/sub-basins have distinct boundaries, as defined by the topography of the area.

Subdivision. Any land that is divided or proposed to be divided into lots, whether contiguous or subject to zoning requirements, for the purpose of sale or lease as part of a larger common plan of development or sale.

Subsoil. The B horizons of soils with distinct profiles. In soils with weak profile development, the subsoil can be defined as the soil below which roots do not normally grow.

Subsurface Drain. A pervious backfield trench, usually containing stone and perforated pipe, for intercepting groundwater or seepage.

Subwatershed. A watershed subdivision of unspecified size that forms a convenient natural unit. See also Subarea.

Sump Failure. A failure of the sump pump that results in inundation of crawl space or basement.

Sump Pump. A pump that discharges seepage from foundation footing drains.

Surcharge. Backup of water in a sanitary or storm sewer system in excess of the design capacity of the system.

Surface Runoff. Precipitation that flows onto the surfaces of roofs, streets, the ground, etc., and is not absorbed or retained by that surface but collects and runs off.

Suspended Solids. Solids either floating or suspended in water.

Swale. An elongated depression in the land surface that is at least seasonally wet, is usually heavily vegetated, and is normally without flowing water. Swales conduct stormwater into primary drainage channels and may provide some groundwater recharge.

Tailwater. The water surface elevation at the downstream side of a hydraulic structure (i.e. culvert, bridge, weir, dam, etc.).

Temporary Stabilization. The covering of soil to ensure its resistance to erosion, sliding, or other movement. The term includes vegetative cover, anchored mulch, or other non-erosive material applied at a uniform density of seventy percent (70%) across the disturbed area.

Thalweg. The deepest point (or centerline) of a channel.

Tile Drain. Pipe made of perforated plastic, burned clay, concrete, or similar material, laid to a designed grade and depth, to collect and carry excess water from the soil.

Tile Drainage. Land drainage by means of a series of tile lines laid at a specified depth, grade, and spacing.

Time of Concentration (tc). The travel time of a particle of water from the most hydraulically remote point in the contributing area to the point under study. This can be considered the sum of an overland flow time and times of travel in street gutters, storm sewers, drainage channels, and all other drainage ways.

Topographic Map. Graphical portrayal of the topographic features of a land area, showing both the horizontal distances between the features and their elevations above a given datum.

Topography. The representation of a portion of the earth's surface showing natural and man-made features of a give locality such as rivers, streams, ditches, lakes, roads, buildings and most importantly, variations in ground elevations for the terrain of the area.

Topsoil. (1) The dark-colored surface layer, or a horizon, of a soil; when present it ranges in depth from a fraction of an inch to 2-3 ft. (2) Equivalent to the plow layer of cultivated soils. (3) Commonly used to refer to the surface layer(s), enriched in organic matter and having textural and structural characteristics favorable for plant growth.

Total Maximum Daily Load. Method used to establish allowable loadings for specified pollutants in a surface water resource to meet established water quality standards.

Toxicity. The characteristic of being poisonous or harmful to plant or animal life. The relative degree or severity of this characteristic.

TP-40 Rainfall. Design storm rainfall depth data for various durations published by the National Weather Service in their Technical Paper 40 dated 1961.

Trained individual. An individual who is trained and experienced in the principles of stormwater quality, including erosion and sediment control as may be demonstrated by state registration, professional certification (such as CESSWI and/or CPESC certification), or other documented and applicable experience or coursework as deemed sufficient by the City that enable the individual to make judgments regarding stormwater control or treatment and monitoring.

Transition Section. Reaches of the stream of floodway where water flows from a narrow cross-section to a wide cross-section or vice-versa.

Tributary. Based on the size of the contributing drainage area, a smaller watercourse which flows into a larger watercourse.

Turbidity. (1) Cloudiness of a liquid, caused by suspended solids. (2) A measure of the suspended solids in a liquid.

Underdrain. A small diameter perforated pipe that allows the bottom of a detention basin, channel or swale to drain.

Unified Soil Classification System. A system of classifying soils that is based on their identification according to particle size, gradation, plasticity index, and liquid limit.

Uniform Flow. A state of steady flow when the mean velocity and cross-sectional area remain constant in all sections of a reach.

Unit Hydrograph. A unit hydrograph is the hydrograph that results from one inch of precipitation excess generated uniformly over the watershed at a uniform rate during a specified period of time.

Urban Drain. A drain defined as “Urban Drain” in Indiana Drainage Code.

Urbanization The development, change or improvement of any parcel of land consisting of one or more lots for residential, commercial, industrial, institutional, recreational or public utility purposes.

Vegetative practices. Any nonstructural or structural BMP that, with optimal design and good soil conditions, utilizes various forms of vegetation to enhance pollutant removal, maintain and improve natural site hydrology, promote healthier habitats, and increase aesthetic appeal. Examples include grass swales, filter strips, buffer strips, constructed wetlands, and rain gardens.

Vegetative Stabilization. Protection of erodible or sediment producing areas with: permanent seeding (producing long-term vegetative cover), short-term seeding (producing temporary vegetative cover), or sodding (producing areas covered with a turf of perennial sod-forming grass).

Water Quality. A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.

Water Resources. The supply of groundwater and surface water in a given area.

Water Table. (1) The free surface of the groundwater. (2) That surface subject to atmospheric pressure under the ground, generally rising and failing with the season or from other conditions such as water withdrawal.

Waterbody. Any accumulation of water, surface, or underground, natural or artificial.

Watercourse. Any river, stream, creek, brook, branch, natural or man-made drainageway in or into which stormwater runoff or floodwaters flow either continuously or intermittently.

Watershed Area. All land and water within the confines of a drainage divide. See also Watershed.

Watershed. The region drained by or contributing water to a specific point that could be along a stream, lake or other stormwater facilities. Watersheds are often broken down into subareas for the purpose of hydrologic modeling.

Waterway. A naturally existing or manmade open conduit or channel utilized for the conveyance of water.

Weir. A channel-spanning structure for measuring or regulating the flow of water.

Wellhead protection area. Has the meaning set forth at 327 IAC 8-4.1-1(27).

Wet-Bottom Detention Basin (Retention Basin) - A basin designed to retain a permanent pool of water after having provided its planned detention of runoff during a storm event.

Wetlands. Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

APPENDIX B

FORMS

Application Checklist
Construction Site Inspection and Maintenance Log
Certification of Completion and Compliance
Notice of Termination Inspection
Residential Lot Plot Plan Permit Request
Commercial Lot Plot Plan Permit Request
Individual Lot Stormwater Pollution Prevention Requirements
Stormwater Long-Term Operation and Maintenance Agreement

City of Madison
Application Checklist for Stormwater Management Approval
(to be completed by Applicant)

Project Name:	
General Location:	
File Number:	Date Completed:

1. Application Fee

	Check Attached

2. Notice of Intent

	Completed Notice of Intent -- State Form #47487

3. Construction Plans

		Project narrative and supporting documents, including the following information:
		An index indicating the location, in the construction plans, of all information required by this subsection.
		Description of the nature and purpose of the project.
		A copy of a legal boundary survey for the site, performed in accordance with Rule 12 of Title 865 of the Indiana Administrative Code or any applicable and subsequently adopted rule or regulation for the subdivision limits, including all drainage easements and wetlands.
		Soil properties, characteristics, limitations, and hazards associated with the project site and the measures that will be integrated into the project to overcome or minimize adverse soil conditions.
		General construction sequence of how the project site will be built, including phases of construction.
		14-Digit Watershed Hydrologic Unit Code.
		A reduced plat or project site map showing the lot numbers, lot boundaries, easements, and road layout and names. The reduced map must be legible and submitted on a sheet or sheets no larger than eleven (11) inches by seventeen (17) inches for all phases or sections of the project site.
		A topographic map of the land to be developed and such adjoining land whose topography may affect the layout or drainage of the development. The contour intervals shall be one (1) foot when slopes are less than or equal to two percent (<2%) and shall be two (2) feet when slopes exceed two percent (>2%). All elevations shall be given in either National Geodetic Vertical Datum of 1929 (NGVD) or North American Vertical Datum of 1988 (NAVD). The horizontal datum of topographic map shall be based on Indiana State Plane Coordinates, NAD83. The map will contain a notation indicating these datum information. a) If the project site is less than or equal to two (2) acres in total land area, the topographic map shall include all topography of land surrounding the site to a distance of at least one hundred (100) feet. b) If the project site is greater than two (2) acres in total land area, the topographic map shall include all topography of land surrounding the site to a distance of at least two hundred (200) feet.
		Identification of any other state or federal water quality permits that are required for construction activities associated with the owner's project site.
		Proof of Errors and Omissions Insurance for the registered professional engineer or licensed surveyor showing a minimum amount of $1,000,000 in coverage.
		Vicinity map depicting the project site location in relationship to recognizable local landmarks, other municipalities, and major roads, such as a USGS topographic quadrangle map, or county or municipal road map.
		An existing project site layout that must include the following information:

		Location, name, and normal water level of all wetlands, lakes, ponds, and water courses on, or adjacent to, the project site.
		Location of all existing structures on the project site.
		One hundred (100) year floodplains, floodway fringes, and floodways. Please note if none exists.
		Soil map of the predominant soil types, as determined by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) Soil Survey, or as determined by a soil scientist. Hydrologic classification for soils should be shown when hydrologic methods requiring soils information are used. A soil legend must be included with the soil map.
		Identification and delineation of vegetative cover such as grass, weeds, brush, and trees on the project site.
		Location of storm, sanitary, combined sewer, and septic tank systems and outfalls.
		Land use of all adjacent properties.
		Identification and delineation of sensitive areas.
		Existing topography at a contour interval appropriate to indicate drainage patterns.
		The location of regulated drains, farm drains, inlets and outfalls, if any of record.
		Location of all existing cornerstones within the proposed development and a plan to protect and preserve them.
	Final project site layout, including the following information:	
		Location of all proposed site improvements, including roads, utilities, lot delineation and identification, proposed structures, and common areas.
		One hundred (100) year floodplains, floodway fringes, and floodways. Please note if none exists.
		Proposed final topography, at a contour interval appropriate to indicate drainage patterns.
	A grading plan, including the following information:	
		Delineation of all proposed land disturbing activities, including off-site activities that will provide services to the project site.
		Location of all soil stockpiles and borrow areas.
		Information regarding any off-site borrow, stockpile, or disposal areas that are associated with a project site, and under the control of the project site owner.
		Existing and proposed topographic information.
	A drainage plan, including the following information:	
		An estimate of the peak discharge, based on the ten (10) year storm event, of the project site for post-construction conditions.
		The proposed 100-year and 10-year release rates determined for the site, showing the methodology used to calculate them and detailing considerations given to downstream restrictions (if any) that may affect the calculated allowable release rates.
		Calculation showing peak runoff rate after development for the 10-year and 100-year return period 24-hour storms do not exceed the respective allowable release runoff rates.
		Location, size, and dimensions of all existing streams to be maintained, and new drainage systems such as culverts, bridges, storm sewers, conveyance channels, and 100-year overflow paths/ponding areas shown as hatched areas, along with the associated easements.
		Locations where stormwater may be directly discharged into groundwater, such as abandoned wells or sinkholes. Please note if none exists.
		Locations of specific points where stormwater discharge will leave the project site.
		Name of all receiving waters. If the discharge is to a separate municipal storm sewer, identify the name of the municipal operator and the ultimate receiving water.
		Location, size, and dimensions of features such as permanent retention or detention facilities, including existing or manmade wetlands, used for the purpose of stormwater management. Include existing retention or detention facilities that will be maintained, enlarged, or otherwise altered and new ponds or basins to be built and the basis of their design.
		The estimated depth and amount of storage required by design of the new ponds or basins.

		One or more typical cross sections of all existing and proposed channels or other open drainage facilities carried to a point above the 100-year high water and showing the elevation of the existing land and the proposed changes, together with the high water elevations expected from the 100-year storm under the controlled conditions called for by the Ordinance or these Technical Standards, and the relationship of structures, streets, and other facilities
4. Stormwater Drainage Technical Report		
	A summary report, including the following information:	
		The significant drainage problems associated with the project;
		The analysis procedure used to evaluate these problems and to propose solutions;
		Any assumptions or special conditions associated with the use of these procedures, especially the hydrologic or hydraulic methods;
		The proposed design of the drainage control system; and
		The results of the analysis of the proposed drainage control system showing that it does solve the project's drainage problems. Any hydrologic or hydraulic calculations or modeling results must be adequately cited and described in the summary description. If hydrologic or hydraulic models are used, the input and output files for all necessary runs must be included in the appendices. A map showing any drainage area subdivisions used in the analysis must accompany the report.
	A Hydrologic/Hydraulic Analysis, consistent with the methodologies and calculation included in the City of Madison Stormwater Technical Standards Manual, including the following information:	
		A hydraulic report detailing existing and proposed drainage patterns on the subject site. The report should include a description of present land use and proposed land use. Any off-site drainage entering the site should be addressed as well. This report should be comprehensive and detail all of the steps the engineer took during the design process.
		All hydrologic and hydraulic computations should be included in the submittal. These calculations should include, but are not limited to: runoff curve numbers and runoff coefficients, runoff calculations, stage-discharge relationships, times-of-concentration and storage volumes.
		Copies of all computer runs. These computer runs should include both the input and the outputs. Electronic copies of the computer runs with input files will expedite the review process and is required to be submitted.
		A set of exhibits should be included showing the drainage sub-areas and a schematic detailing of how the computer models were set up.
		A conclusion which summarizes the hydraulic design and details how this design satisfies the Ordinance and Technical Standards.
5. Stormwater Pollution Prevention Plan for Construction Sites		
	Location, dimensions, detailed specifications, and construction details of all temporary and permanent stormwater quality measures.	
	Temporary stabilization plans and sequence of implementation.	
	Permanent stabilization plans and sequence of implementation.	
	Temporary and permanent stabilization plans shall include the following:	
		Specifications and application rates for soil amendments and seed mixtures.
		The type and application rate for anchored mulch.
	Construction sequence describing the relationship between implementation of stormwater quality measures and stages of construction activities.	
	A typical erosion and sediment control plan for individual lot development.	
	Self-monitoring program including plan and procedures.	
	A description of potential pollutant sources associated with the construction activities, which may reasonably be expected to add a significant amount of pollutants to stormwater discharges.	
	Material handling and storage associated with construction activity shall meet the spill prevention and spill response requirements in 327 IAC 2-6.1.	

	Name, address, telephone number, and list of qualifications of the trained individual in charge of the mandatory stormwater pollution prevention self-monitoring program for the project site.
6. Post-Construction Stormwater Pollution Prevention Plan	
	A description of potential pollutant sources from the proposed land use, which may reasonably be expected to add a significant amount of pollutants to stormwater discharges.
	Location, dimensions, detailed specifications, and construction details of all post-construction stormwater quality measures.
	A description of measures that will be installed to control pollutants in stormwater discharges that will occur after construction activities have been completed. Such practices include infiltration of run-off, flow reduction by use of open vegetated swales and natural depressions, buffer strip and riparian zone preservation, filter strip creation, minimization of land disturbance and surface imperviousness, maximization of open space, and stormwater retention and detention ponds.
	A sequence describing when each post-construction stormwater quality measure will be installed.
	Stormwater quality measures that will remove or minimize pollutants from stormwater run-off.
	Stormwater quality measures that will be implemented to prevent or minimize adverse impacts to stream and riparian habitat.
	A narrative description of the maintenance guidelines for all post-construction stormwater quality measures to facilitate their proper long term function. This narrative description shall be made available to future parties who will assume responsibility for the operation and maintenance of the post-construction stormwater quality measures.

Date: _____
Project: _____
Inspected by: _____

Type of Inspection: ☐ Scheduled Weekly ☐ Rain Event

CONSTRUCTION SITE INSPECTION AND MAINTENANCE LOG
(To be Completed by Property Owner or Agent)

All stormwater pollution prevention BMP's shall be inspected and maintained as needed to ensure continued performance of their intended function during construction and shall continue until the entire site has been stabilized and a Notice of Termination has been issued. An inspection of the project site must be completed by the end of the next business day following each measurable storm event. If there are no measurable storm events within a given week, the site should be monitored at least once in that week. Maintenance and repair shall be conducted in accordance with the accepted site plans. This log shall be kept as a permanent record and must be made available to the City, in an organized fashion, within forty-eight (48) hours of a request.

Yes	No	N/A	
			1. Is the CSGP NOI and other required site information posted at the entrance?
			2. Is a construction entrance installed and functioning properly?
			3. Are construction staging & parking areas restricted to areas designated on the plans?
			4. Are public and private streets clean of sediment, debris and mud?
			5. Are appropriate practices installed where stormwater leaves the site?
			6. Are all stormwater discharge points (outfalls) adequately stabilized, free of erosion and sediment transport?
			7. Has all silt fence been installed properly and being maintained? (entrenched - upright - fabric not torn - terminated to higher ground - properly joined at ends)
			8. Are other sediment control barriers in place and functioning properly?
			9. Are appropriate perimeter protections in place and functioning properly?
			10. Are check dams, sediment basins & traps installed according to plan and properly maintained?
			11. Is inlet protection installed properly on all inlets & being maintained?
			12. Have swales and ditches been stabilized or protected?
			13. Has temporary stabilization of disturbed ground been addressed? (dormant for 15 days?)
			14. Is permanent stabilization of disturbed ground progressing on all completed areas?
			15. Do water pumping operations have a protected outlet and discharge clear water?
			16. Are all dewatering structures functioning properly?
			17. Is a designated concrete/equipment washout area established, clearly marked and being utilized?
			18. Is solid waste properly contained & a stable access provided to the storage & pickup area?
			19. Are fuel tanks and other hazardous materials safely stored and protected?
			20. Is spill response equipment on-site and easily accessible?
			21. Are temporary soil stockpiles in approved areas & properly protected?
			22. Are diversion swales and/or waterbars installed to plan & protected?

If you answered “no” to any of the above questions, describe any corrective action which must be taken to remedy the problem and when the corrective actions are completed.

Corrective Action Log

Date	Location	Correction Needed	Date Completed	Initials	Notes

I certify under penalty of law that this document was completed to the best of my knowledge and belief on the date listed below per my signature. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Inspector:	Date:

Certification of Completion & Compliance

CERTIFICATE OF COMPLETION & COMPLIANCE

Name of project:_____

Address of premises on which land alteration was accomplished:_____
_____

Inspection Date(s):_____ Stormwater Permit Number:_____

Relative to plans prepared by:_____ on_____
(date)

I hereby certify that:

1. I am familiar with drainage requirements applicable to such land alteration (as set forth in the Stormwater Management Ordinance of the City of Madison); and

2. I (or a person under my direct supervision) have personally inspected the completed work and examined the drainage permit and its conditions, as-built plans, and final drainage calculations consistent with as-built conditions performed pursuant to the above referenced drainage permit; and

3. To the best of my knowledge, information, and belief, such land alteration has been performed and completed in conformity with all such drainage requirements, except _____
_____
_____

Signature: _____ Date: _____

Typed or Printed Name: _____ Phone: (___)_____

(SEAL)

Business Address: _____
_____
_____
_____

SURVEYOR ENGINEER
(circle one)

Indiana Registration No._____

Date: _____
Project: _____
Inspected by: _____

NOTICE OF TERMINATION INSPECTION
(To be Completed by the City of Madison or Agent)

All construction sites shall undergo a final inspection by the City following submittal of a Notice of Termination (NOT) by the project owner to ensure the site is stabilized and that post construction BMPs have been properly installed.

Yes	No	N/A	
			1. Have all earth disturbing activities been completed?
			2. Are all soils stabilized with either vegetation or mulch?
			3. Are all drainageways stabilized with either vegetation, rip rap, or other armament?
			4. Have all temporary erosion and sediment control measures been removed?
			5. Has all construction waste, trash, and debris been removed from the site?
			6. Have all permanent stormwater quality BMPs been installed in accordance with the plans, specifications, and details?
			7. Are all permanent BMPs free of sediment accumulation resulting from construction activities?

If you answered "no" to any of the above questions, describe any corrective action which must be taken to remedy the problem and when the corrective actions are to be completed.

MADISON Indiana
Planning, Preservation and Design

101 W Main St
Madison, IN 47250
(812) 265-8324

Stormwater Management Permit Application

Non-Residential	Application	Resubmittal Fee
Up to 5 Acres:	$600.00	$500.00
5.1-10 Acres:	$1,300.00	$1,200.00
10.1-25 Acres:	$2,100.00	$2,000.00
Over 25.1 Acres:	$2,600.00	$2,500.00

Residential	Application	Resubmittal Fee
1-4 Lots	$450.00	$350.00
5-25 Lots	$600.00	$500.00
26-75 Lots	$1,100.00	$1,000.00
76-150 Lots	$1,600.00	$1,500.00
More than 150 Lots	$2,600.00	$2,500.00

Paper applications will be accepted by the Office of Planning, Preservation, and Design; however, electronic submissions through our Permit Portal are preferred. This application can be submitted electronically at www.madison-in.gov/reporting.

Purpose: Application is hereby made for a development with the land disturbance of one (1) acre or greater to obtain a Construction Stormwater General Permit (CSGP) through IDEM and the MS4 program of the city.

Location of the Project

Street Address: _____

Intersecting Street (if applicable): _____

Parcel ID(s) (can be obtained from the office): _____

Receiving Water(s): _____

Approximate Distance to Receiving Water(s): _____

Project Details

Project Type:

- ☐ Non-Residential
- ☐ Residential

Number of Residential Lots (if applicable): _____

Total Disturbed Area (acres): _____ Added Impervious Surface (sq. ft.): _____

Estimated Start Date: _____ Estimated Completion Date: _____

Property Owner Information

Owner Name: _____

Mailing Street Address: _____

City: _____ State: _____ Zip: _____

Phone (Preferred): _____ Email: _____

Plan Preparer Information

Contact Name: _____

Company: _____

Mailing Street Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Email: _____

Trained Individual Assigned to Stormwater Pollution Prevention Plan (SWPPP) Implementation

Contact Name: _____

Company: _____

Mailing Street Address: _____

City: _____ State: _____ Zip: _____

Phone (Preferred): _____ Email: _____

Qualifications/Certifications (attach additional sheets if necessary): _____

Please Identify the final land use(s) for the site and list ALL of the Post-Construction practices and systems that are proposed to address pollutants associated with the final land uses of the site (attach additional sheets if necessary):

_____

_____

I certify that the information provided in this application is true and accurate to the best of my ability. I understand that I must abide by the stormwater quality controls included in the Stormwater Pollution Prevention Plan (SWPPP) and comply with the requirements of the City of Madison Stormwater Ordinance and Technical Standards, State of Indiana Construction Stormwater General Permit (INRA00000), and all other applicable federal, state and local stormwater requirements. I understand that All controls included in the SWPPP, as well as additional controls beyond those specified in the SWPPP deemed necessary to maintain compliance with the City of Madison and other applicable Code(s), shall be installed and maintained. I acknowledge that the Trained Individual shall oversee, direct, and inspect the installation and maintenance of the controls, and to document site activities, SWPPP implementation, and modifications to the plan.

_____ _____

Date Signature of Applicant

COMPLETED BY OFFICE

Application Accepted on: _____ Application Accepted by: _____

Application Approved on: _____ Stormwater Department: _____

Documentation Review (Completed by Planning Office)

_____ Application Checklist

_____ Construction Plan Sheets

_____ Stormwater Drainage Technical Report

_____ Stormwater Pollution Prevention Plan

Individual Lot
Stormwater Pollution Prevention Requirements

City of Madison

FOR COMPLIANCE WITH CITY OF MADISON STORMWATER CODE

THE INDIVIDUAL LOT OWNER OR OPERATOR IS RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF STORMWATER POLLUTION PREVENTION CONTROLS UNTIL THE ENTIRE LOT IS COMPLETE AND 100% STABILIZED.

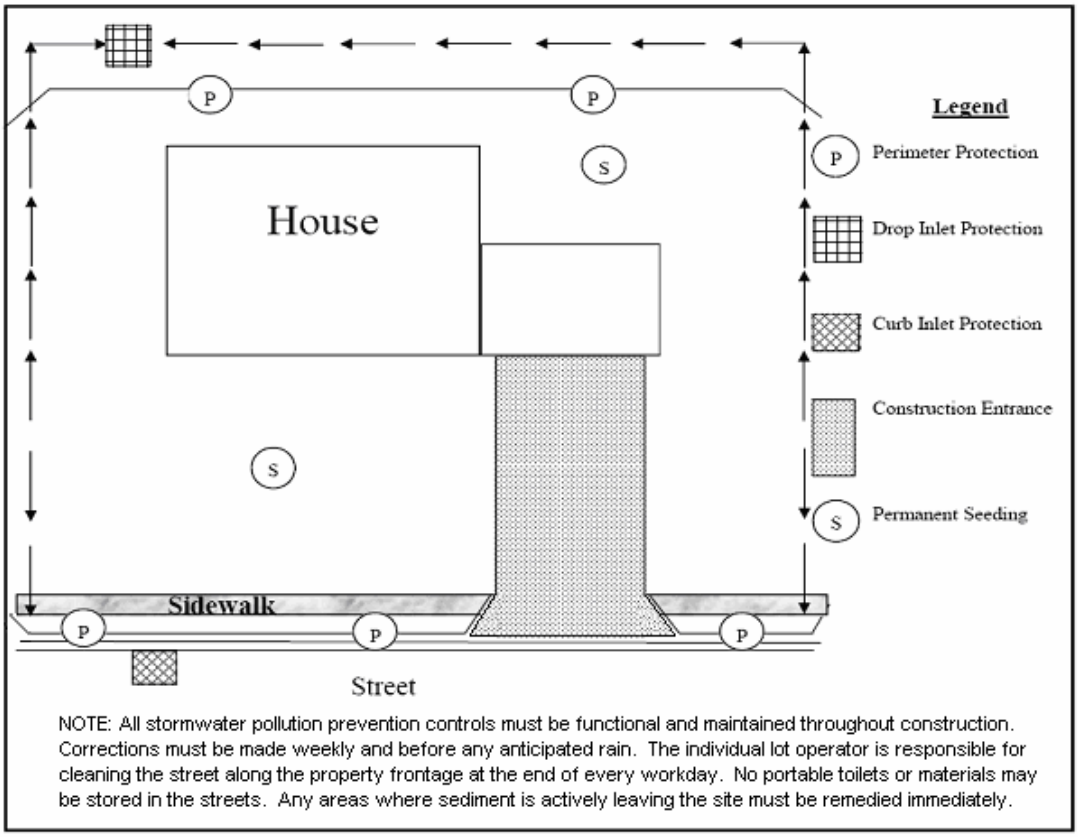
- Initial stormwater controls such as construction entrances, curbside and rear of lot storm inlet protection (geo-textile wrapped under grate is prohibited), and perimeter controls (typically silt fence) must be in place BEFORE ANY LOT DISTURBANCE begins.
- All construction materials must be staged off of the street and on the lot behind perimeter controls.
- Portable toilets must be kept off of the street and should be placed on even ground on the lot behind perimeter controls.
- All lots must provide and utilize appropriate trash containment for site waste.
- Contractors must use appropriate practices for concrete, mortar, and paint washout. These materials must be properly contained and NOT enter the storm drains or other conveyances.
- Any off site tracking of sediment into the street, or off site sedimentation into swales or drains MUST be cleaned as soon as possible and by no later than the end of the day.
- Lot frontage should be cleaned and acceptable in appearance at the end of every business day.
- Areas where operations have impacted adjacent lots or rear yard swales MUST be repaired to design condition and 100% stabilized.

PLEASE NOTE: ANY INSPECTION WILL FAIL IF THE CORRECT STORMWATER POLLUTION PREVENTION CONTROLS ARE NOT IN PLACE AND PROPERLY MAINTAINED.

Please direct any questions regarding stormwater pollution prevention requirements to:

Stormwater Department
City of Madison
101 W Main St
Madison, IN 47250

Stormwater Pollution Prevention Controls on Individual Lots

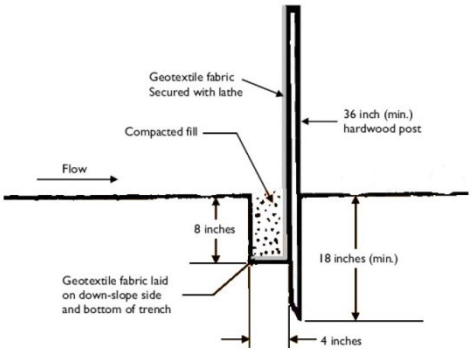


NOTE: All stormwater pollution prevention controls must be functional and maintained throughout construction. Corrections must be made weekly and before any anticipated rain. The individual lot operator is responsible for cleaning the street along the property frontage at the end of every workday. No portable toilets or materials may be stored in the streets. Any areas where sediment is actively leaving the site must be remedied immediately.

Construction Sequence

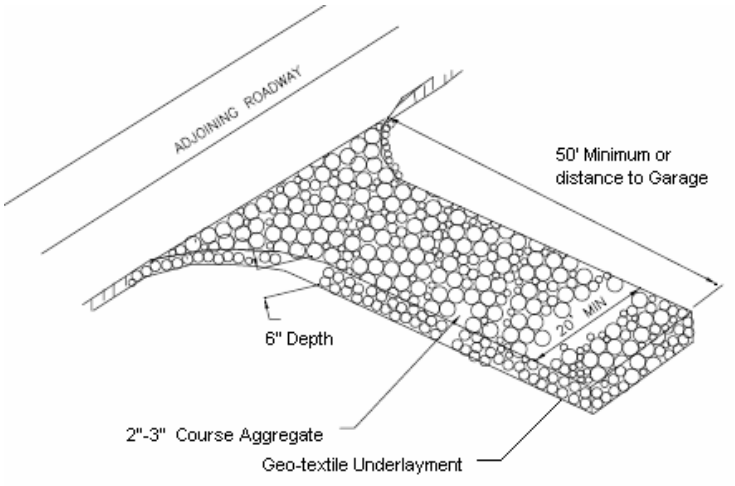
1. Install construction entrance.
    a. Use #2 stone. Flare entrance at street so it can handle vehicle turn radius. See Detail.
2. Install perimeter protection.
    a. Protection along the sides of the lot is only necessary if the adjacent lot is built out or if stormwater runoff will drain in that direction.
    b. Make sure perimeter protections are turned into the lot where they terminate to create a ponding area. See above diagram.
    c. Rear of lot perimeter protection should be installed to protect the rear yard swale.
3. Install protections on storm inlets at curbside and at rear of lot.
    a. Geo-textile or "fabric" wrapped underneath the grate is PROHIBITED.
    b. Make sure curbside inlet protection leaves the top 3-4 inches of the storm grate exposed to allow for overflow to enter the storm inlet, preventing ponding.
4. Lot disturbance may begin once the controls listed above are in place.
5. Maintain lot controls at all times and repair as soon as possible when a correction is needed.
    a. If sediment is actively leaving the site due to a failing control such as tracking or an operation such as dewatering, it must be corrected IMMEDIATELY.
6. Stabilize all exposed soils with vegetation, mulch, or stone when construction is complete.
    a. Lot is considered stabilized once vegetation has reached 100% coverage and 70 % density.
7. Remove temporary stormwater pollution prevention controls.
    a. These may be removed when exposed soils have been stabilized with vegetation, sod, or mulch.
    b. Seed alone is not a stabilization measure until it germinates and achieves proper coverage.

BMP DETAILS



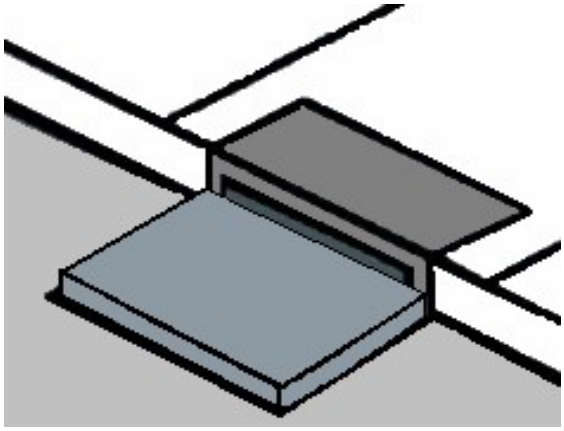
Silt Fence

1. Install silt fence parallel to the contour of the land.
2. Extend ends of silt fence upslope 3-4 feet to allow for ponding areas behind the fence.
3. Excavate trench 8 inches deep and 4 inches wide.
4. Install with stakes on the down slope side of fence.
5. Bury 12 inches of fabric in the trench, extending the bottom 4 inches toward the upslope side.
6. Backfill trench on both sides of fence and compact.
7. Join silt fence sections by wrapping two posts and driving them in together. Do not use any other method of joining.
8. Inspect weekly and within 24 hrs of a ½" of rain. Silt fence should be cleaned out when the sediment has reached 1/3 the height of the exposed fencing. Repair silt fence where torn or damaged. Complete repairs before the next anticipated rain and by no later than one week from the date they are noticed.



Construction Entrance

1. Install construction entrance from street to face of proposed building or at a 50' minimum length. Use #2 stone at a 6" minimum depth.
2. A geo-textile is required underneath the entrance to extend its functionality.
3. Flare out entrance where it meets the street so that vehicle turn radiuses do not travel over disturbed ground.
4. Perimeter Controls (silt fence) should be turned into the lot for a few feet where they meet the construction entrance.
5. Inspect weekly and within 24 hrs of a ½" of rain. Freshen or replace stone as needed to prevent off site tracking. If offsite tracking is occurring, clean up immediately, and correct the reason why the drive is failing as soon as possible. Complete repairs before the next anticipated rain and by no later than one week from the date they are noted.



Inlet Protection

1. Install inlet protection on all curbside and rear of lot storm inlets within the flow line of the active lot.

2. Curbside inlet protection should be installed so that 3– 4 inches of the top of the casting is exposed to allow for overflow, preventing excessive ponding.

3. Wrapping geo-textile underneath the grate for protection or straw bale barriers are PROHIBITED practices.

4. Make sure inlet protection is securely fastened to the storm grate and installed per the manufacturer's recommendations.

5. Inspect weekly and within 24 hrs of a ½" of rain. Sediment accumulation or standing water around the inlet can indicate the need for maintenance. Clean protection when clogged with sediment or when it reaches ½ of the storage capacity or height of the control. Replace protection if torn or worn. Clean sediment from street around the storm inlet and place back onto lot behind perimeter controls. Complete repairs before the next anticipated rain and by no later than one week from the day they are noted.

LONG-TERM OPERATION AND MAINTENANCE AGREEMENT

File No.:_____ Parcel Number:_____

As accepted through SWQMP No.:_____

Project Name: _____

Primary Function:

_____

_____

THIS AGREEMENT, made and entered on this ____ day, of the month _____, of the year _____ by and between_____ ("OWNER") and the City of Madison, Indiana, acting by and through it duly authorized representative.

WITNESS, that

WHEREAS, City of Madison Stormwater Ordinance establishes requirements for stormwater quality best management practices and a Stormwater Quality Management Permit (SWQMP) to manage the quality of stormwater discharged from areas of urban development and redevelopment; and

WHEREAS, under said Ordinance the City of Madison shall have the authority to inspect private systems within the City of Madison and to order such corrective actions to said private stormwater management systems as are necessary to maintain properly the stormwater management systems within the City of Madison; and

WHEREAS, under said Ordinance it is provided that Stormwater Quality Best Management Practices (BMPs) not owned municipally must be maintained by the property owner according to the terms of Long-Term Operation and Maintenance Agreement, that must be implemented before a SWQMP is approved; and

WHEREAS, The City of Madison has adopted and approved technical guidelines relating to stormwater BMPs in the City of Madison; and

WHEREAS, the OWNER is the legal title-holder of certain real property commonly known as, and more particularly described by, an instrument recorded in the office of the Recorder of the City of Madison, in Deed number _____, or as Instrument number _____ (herein after called the "Property"); and

WHEREAS, OWNER is proceeding to build on, develop, or redevelop the property; and

WHEREAS, the Stormwater Pollution Prevention Plan (SWPPP) and Long-Term Operation and Maintenance Plan, certified by _____, a licensed Professional Engineer, dated this day of _____ 20__ , is on file in the City of Madison; is expressly made a part hereof; and as approved or to be approved by the City of Madison, provides for stormwater quality management within the confines of the property; and

WHEREAS, the City of Madison and the OWNER agree that the health, safety, and general welfare of the residents of the City of Madison require that on-site stormwater quality BMPs be constructed, operated, and maintained on the property; and

WHEREAS, the City of Madison requires that onsite stormwater facilities in accordance with the Stormwater Pollution Prevention Plan (SWPPP) and Long-Term Operation and Maintenance Plan be adequately constructed and installed, operated, and maintained by the OWNER; and

WHEREAS, an approved Stormwater Pollution Prevention Plan and Long-Term Operation and Maintenance Plan will adequately illustrate the location type and extent of stormwater quality BMPs, minimum inspection procedures and schedule, minimum operation procedures and schedule, and anticipated minimum maintenance activities including when and how to remove accumulated/collected/filtered/amassed/grown excess vegetation, sediment, debris, trash, pollutant and/or forms of pollution from the stormwater quality best management practices.

NOW, THEREFORE,

In consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties agree as follows:

1. The on-site stormwater quality BMPs shall be constructed by the OWNER in accordance with the SWPPP and Long-Term Operation and Maintenance Plan.

2. The OWNER shall operate and maintain the stormwater quality BMPs as directed by the Long- Term Operation and Maintenance Plan in good working order acceptable to the City of Madison.

3. The OWNER agrees that inspections will be performed by a Qualified Professional.

4. The OWNER agrees that inspections will be documented and include the following information:
    a. A description of the current operational or functional status of the stormwater quality BMPs. For structures that accumulate sediment, trash, debris, or other pollutant or form of pollution, an indication of used and remaining capacity (fraction, percentage, depth or volume) shall be given to identify when the BMP must be cleaned out.
    b. Identification of any necessary repairs, sediment/debris removal or replacement of all or portions of the stormwater system(s).
    c. The results of any field or laboratory analyses performed.
    d. Other relevant or unusual observations related to the system(s).
    e. Action plan to prevent premature stormwater system failure as consistent with the Long-Term Operation and Maintenance Agreement(s) provisions.
    f. Action plan to prevent the premature system failure that exceeds the Long-Term Operation and Maintenance Agreement(s) provisions, but are necessary to prevent stormwater pollution from leaving the site.

5. The OWNER hereby grants permission to the City of Madison, its authorized agents and employees, the right to enter the property to inspect the stormwater quality best management practices whenever it deems necessary. Whenever possible, the City of Madison shall notify the OWNER prior to entering the property.

6. In the event the OWNER fails to maintain stormwater quality best management practices in accordance with the SWPPP and Long-Term Operation and Maintenance Plan in good working order acceptable to the City of Madison, City of Madison staff or representatives may enter the property and take whatever steps it deems necessary to repair or maintain said stormwater quality best management practices. This provision shall not be construed to allow the City of Madison to erect any structure of a permanent nature on the land of the OWNER without first obtaining written approval of the OWNER. It is expressly understood and agreed that the City of Madison is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the City of Madison.

7. In the event that the City of Madison, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the OWNER shall reimburse the City of Madison upon demand, within ninety (90) days of receipt thereof, for all costs incurred by City of Madison hereunder. In the event the OWNER shall fail to reimburse City of Madison within said ninety (90) days, City of Madison may institute such legal measures as are deemed necessary to insure compliance with this agreement and to recover all sums expended hereunder, to include costs' and reasonable attorney fees.

8. It is the intent of this Agreement to guarantee the proper maintenance of onsite stormwater quality best management practices by the OWNER; provided, however, that this Agreement shall not be deemed to create or affect any additional liability of the OWNER for damages alleged to have resulted from or been caused by stormwater management practices.

9. The OWNER, its executors, administrators, assigns, and any other successors in interest, shall indemnify and hold City of Madison and its agents and employees harmless for any and all damages, accidents, casualties, occurrences, or claims which might arise or be asserted against City of Madison from the construction, presence, existence, operation or maintenance of the stormwater quality best management practices by the OWNER or City of Madison.

10. In the event a claim is asserted against City of Madison, its agents or employees for the construction, presence, existence, operation, or maintenance of the stormwater quality BMP by the OWNER, City of Madison shall notify the OWNER, and the OWNER shall defend at its own expense any suit based on such claim. If any judgment or claims against City of Madison, its agents or employees shall be allowed, the OWNER shall pay all costs and expenses in connection therewith.

11. This Agreement, as attached by the SWPPP and Long-Term Operation and Maintenance Plan, shall be recorded among the land records of City of Madison, and shall constitute a covenant running with the land, and shall be binding on the OWNER, its administrators, executors, assigns, heirs, and any other successor in interest. The name and mailing address of the OWNER shall be noted on the plat as well.

WITNESS the following signatures and seals:

City of Madison, Indiana

By: _____

Signature: _____

Title: _____

OWNER

Owner Name: _____

Signature: _____

Address: _____

_____

Phone: _____

ATTEST:

_____

WITNESS my hand and seal this _____ day of _____, _____

_____

Notary

Instrument Prepared by:

_____

_____

Printed Name

My Commission Expires:

_____

Resident of _____ County,

APPENDIX C

CONSTRUCTION BMPs

BMP CN – 101
WHEEL WASH

DESCRIPTION

When a stabilized construction entrance is not preventing sediment from being tracked onto pavement, a wheel wash may be installed. Wheel washing is generally an effective BMP when installed with careful attention to topography. For example, a wheel wash can be detrimental if installed at the top of a slope abutting a right-of-way where the water from the dripping truck can run unimpeded into the street. Pressure washing combined with an adequately sized and surfaced pad with direct drainage to a large 10-foot x 10-foot sump can be very effective.

ADVANTAGES

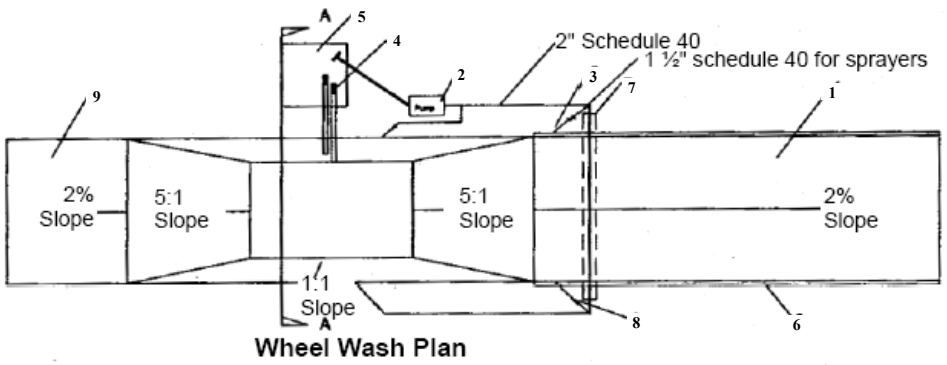
1. Wheel washes reduce the amount of sediment transported onto paved roads by motor vehicles.

DESIGN CRITERIA

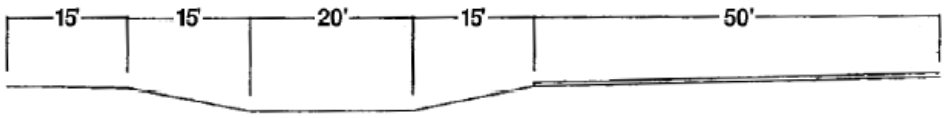
1. Suggested details are shown in Figure CN-101-A. The City may allow other designs.
2. A minimum of 6 inches of asphalt treated base (ATB) over crushed base material or 8 inches over a good subgrade is recommended to pave the wheel wash.
3. Use a low clearance truck to test the wheel wash before paving. Either a belly dump or lowboy will work well to test clearance.
4. Keep the water level from 12 to 14 inches deep to avoid damage to truck hubs and filling the truck tongues with water.
5. Midpoint spray nozzles are only needed in extremely muddy conditions.
6. Wheel wash systems should be designed with a small grade change, 6 to 12 inches for a 10-foot-wide pond, to allow sediment to flow to the low side of pond to help prevent re-suspension of sediment.
7. A drainpipe with a 2- to 3-foot riser should be installed on the low side of the pond to allow for easy cleaning and refilling.
8. Polymers may be used to promote coagulation and flocculation in a closed-loop system. Polyacrylamide (PAM) added to the wheel wash water at a rate of 0.25 - 0.5 pounds per 1,000 gallons of water increases effectiveness and reduces cleanup time.
9. If PAM is already being used for dust or erosion control and is being applied by a water truck, the same truck can be used to change the wash water.
10. The wheel wash should start out the day with fresh water. The wash water should be changed a minimum of once per day.
11. On large earthwork jobs where more than 10-20 trucks per hour are expected, the wash water will need to be changed more often.
12. Wheel wash or tire bath wastewater shall be discharged to a separate on-site treatment system, such as closed-loop recirculation or land application, or to the sanitary sewer with proper local sewer utility approval.

REFERENCE

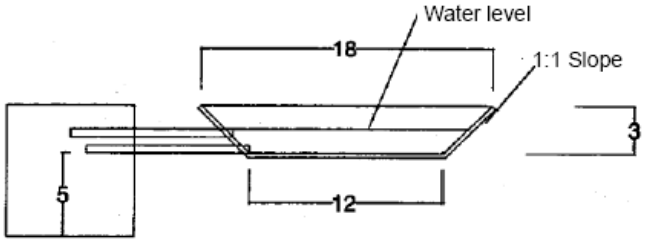
City of Tacoma, Surface Water Management Manual, 2003 or later



Wheel Wash Plan



Elevation View



Section A-A
NTS

Notes:

1. Asphalt construction entrance 6 in. asphalt treated base (ATB).
2. 3-inch trash pump with floats on the suction hose.
3. Midpoint spray nozzles, if needed.
4. 6-inch sewer pipe with butterfly valves. Bottom one is a drain. Locate top pipe's invert 1 foot above bottom of wheel wash.
5. 8 foot x 8 foot sump with 5 feet of catch. Build so can be cleaned with trackhoe.
6. Asphalt curb on the low road side to direct water back to pond.
7. 6-inch sleeve under road.
8. Ball valves.
9. 15 foot. ATB apron to protect ground from splashing water.

Figure CN-101-A

BMP CN – 102
DEWATERING STRUCTURE

DESCRIPTION

Water which is pumped from a construction site usually contains a large amount of sediment. A dewatering structure is designed to remove the sediment before water is released off-site.

This practice includes several types of dewatering structures which have different applications dependent upon site conditions and types of operation. Other innovative techniques for accomplishing the same purpose are encouraged, but only after specific plans and details are submitted to and approved by the City.

DESIGN CRITERIA

1. A dewatering structure must be sized (and operated) to allow pumped water to flow through the filtering device without overtopping the structure.
2. Material from any required excavation shall be stored in an area and protected in a manner that will prevent sediments from eroding and moving off-site.
3. An excavated basin (applicable to "Straw Bale/Silt Fence Pit") may be lined with filter fabric to help reduce scour and to prevent the inclusion of soil from within the structure.
4. Design criteria more specific to each particular dewatering device can be found in Figures CN-102-A through CN-102-C.
5. A dewatering structure may not be needed if there is a well-stabilized, vegetated area onsite to which water may be discharged. The area must be stabilized so that it can filter sediment and at the same time withstand the velocity of the discharged water without eroding. A minimum filtering length of 75 feet must be available in order for such a method to be feasible.
6. The filtering devices must be inspected frequently and repaired or replaced once the sediment build-up prevents the structure from functioning as designed.
7. The accumulated sediment which is removed from a dewatering device must be spread on-site and stabilized or disposed of at an approved disposal site as per approved plan.

<u>Portable Sediment Tank (see Figure CN102-A)</u>

- The structure may be constructed with steel drums, sturdy wood or other material suitable for handling the pressure exerted by the volume of water.
- Sediment tanks will have a minimum depth of 2 ft.
- The sediment tank shall be located for easy clean-out and disposal of the trapped sediment and to minimize the interference with construction activities.
- The following formula shall be used to determine the storage volume of the sediment tank:

  Pump discharge (gallons/min.) x 16 = cubic feet of storage required

- Once the water level nears the top of the tank, the pump must be shut off while the tank drains and additional capacity is made available.
- The tank shall be designed to allow for emergency flow over top of the tank. Clean-out of the tank is required once one-third of the original capacity is depleted due to sediment accumulation. The tank shall be clearly marked showing the clean-out point.

Filter Box (see Figure CN-102-B)

- The box selected should be made of steel, sturdy wood or other materials suitable to handle the pressure requirements imposed by the volume of water. Normally readily available 55 gallon drums welded top to bottom will suffice in most cases.
- Bottom of the box shall be made porous by drilling holes (or some other method).
- Coarse aggregate shall be placed over the holes at a minimum depth of 12 inches, metal “hardware” cloth may need to be placed between the aggregate and the holes if holes are drilled larger than the majority of the stone.
- As a result of the fast rate of flow of sediment-laden water through the aggregate, the effluent must be directed over a well-vegetated strip of at least 50 feet after leaving the base of the filter box.
- The box shall be sized as follows:

  Pump discharge (gallons/min.) x 16 = cubic feet of storage required

- Once the water level nears the top of the box, the pump must be shut off while the box drains and additional capacity is made available.
- The box shall be designed/constructed to allow for emergency flow over the top of this box.
- Clean-out of the box is required once one-third of the original capacity is depleted due to sediment accumulation. The tank shall be clearly marked showing the clean-out point.
- If the stone filter does become clogged with sediment so that it no longer adequately performs its function, the stones must be pulled away from the inlet, cleaned and replaced.
- Using a filter box only allows for minimal settling time for sediment particles; therefore, it should only be used when site conditions restrict the use of the other methods.

Straw Bale/Silt Fence Pit (see Figure CN-102-C)

- Measure shall consist of straw bales, silt fence, a stone outlet (a combination of riprap and aggregate) and a wet storage pit oriented as shown in Figure CN-102-C.
- The structure must have a capacity which is dictated by the following formula:

  Pump discharge (gallons/min.) x 16 = cubic feet of storage required

- In calculating the capacity, one should include the volume available from the floor of the excavation to the crest of the stone weir.
- In any case, the excavated area should be a minimum of 3 feet below the base of the perimeter measures (straw bales or silt fence).
- The perimeter measures must be installed as per the guidelines found in BMP-4, STRAW BALE BARRIER and BMP-5, SILT FENCE.
- Once the water level nears the crest of the stone weir (emergency overflow), the pump must be shut off while the structure drains down to the elevation of the wet storage.
- The wet storage pit may be dewatered only after a minimum of 6 hours of sediment settling time. This effluent should be pumped across a well vegetated area or through a silt fence prior to entering a watercourse.
- Once the wet storage area becomes filled to one-half of the, excavated depth, accumulated sediment shall be removed and properly disposed of.
- Once the device has been removed, ground contours will be returned to original condition.

REFERENCE

United States Army Corps of Engineers, Handbook for the Preparation of Storm Water Pollution Prevention Plans for Construction Activities, 1997 or later

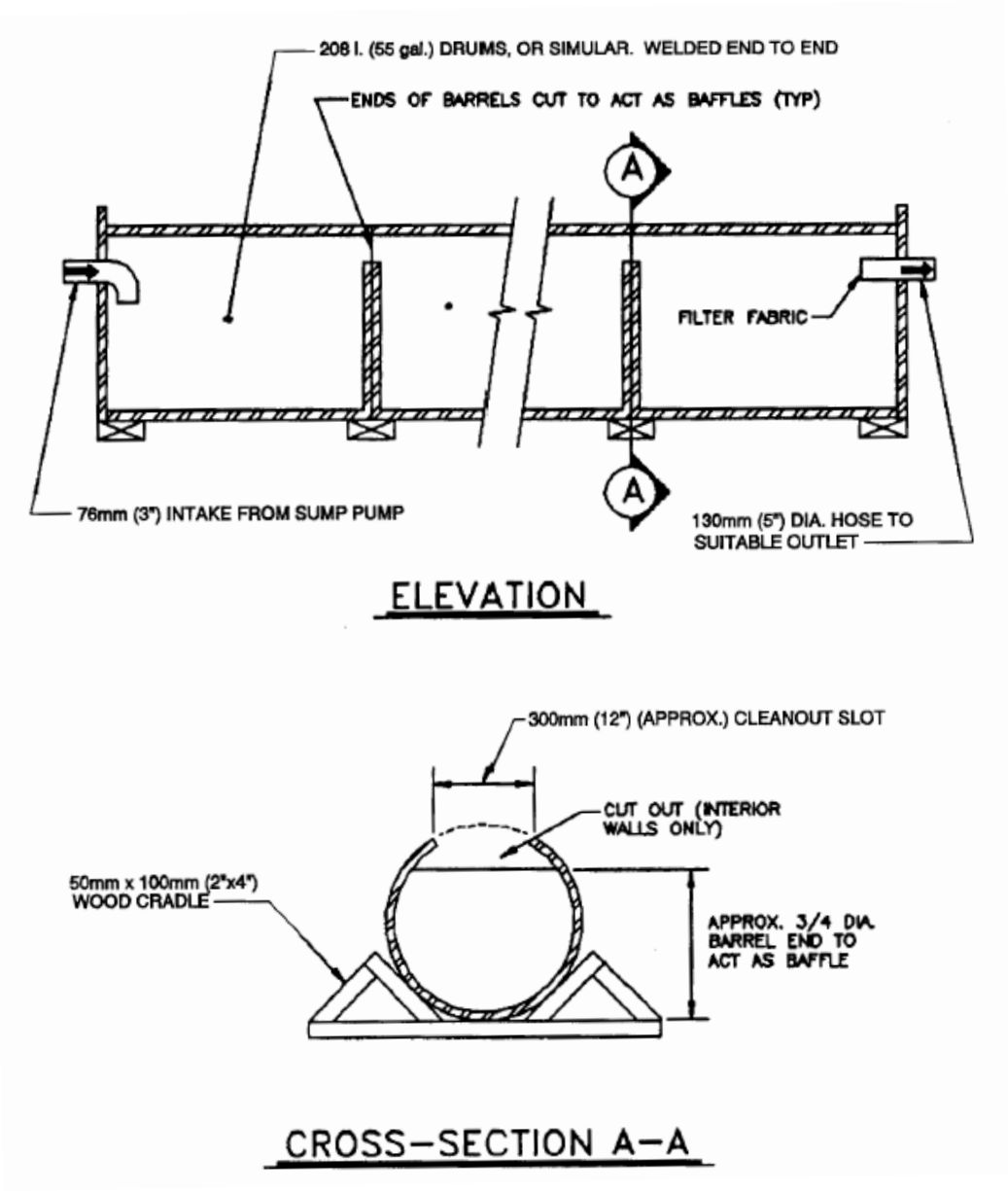


Figure CN-102-A
Portable Sediment Tank

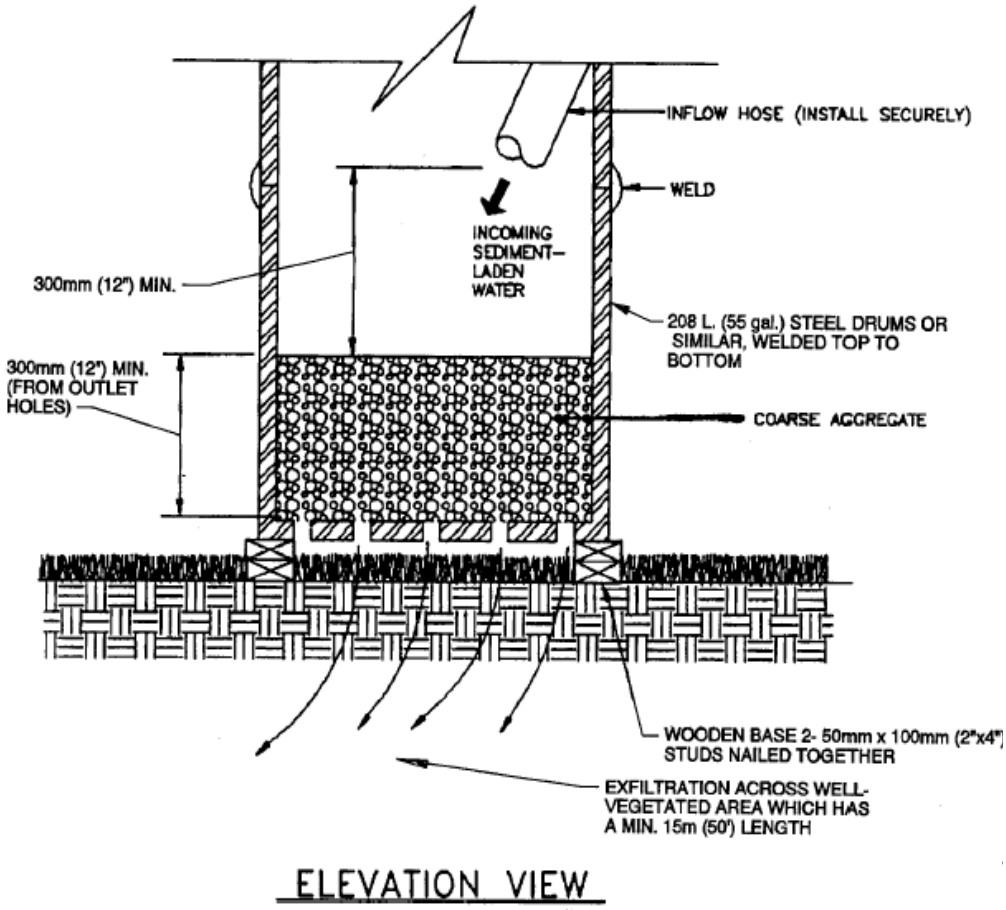


Figure CN-102-B
Filter Box

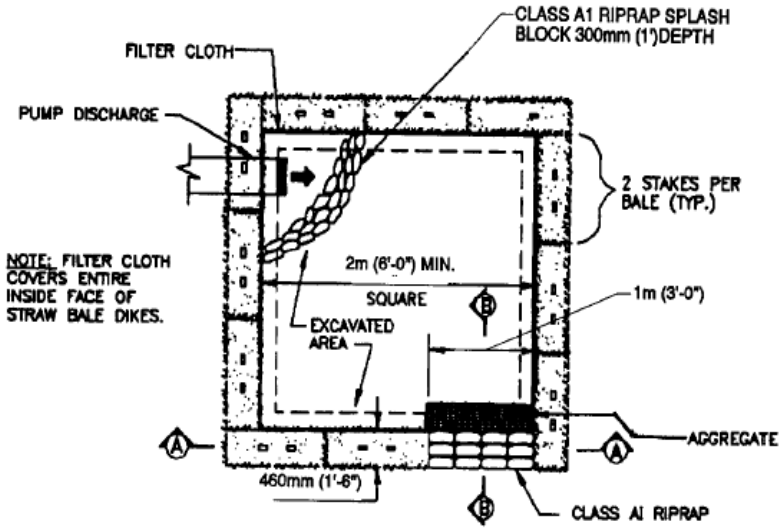


Figure CN-102-C
Straw Bale/Silt Fence Pit

BMP CN – 103
SPILL PREVENTION AND CONTROL

DESCRIPTION

These procedures and practices are implemented to prevent and control spills in a manner that minimizes or prevents the discharge of spilled material to the drainage system or watercourses.

This best management practice (BMP) applies to all construction projects. Spill control procedures are implemented anytime chemicals and/or hazardous substances are stored. Substances may include, but are not limited to:

- Soil stabilizers/binders
- Dust Palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals
- Fuels
- Lubricants
- Other petroleum distillates

To the extent that the work can be accomplished safely, spills of oil, petroleum products, sanitary and septic wastes, and substances listed under 40 Code of Federal Regulations (CFR) parts 110, 117, and 302 shall be contained and cleaned up immediately.

LIMITATIONS

1. This BMP only applies to spills caused by the contractor.
2. Procedures and practices presented in this BMP are general. Contractor shall identify appropriate practices for the specific materials used or stored on-site in advance of their arrival at the site.

DESIGN CRITERIA

1. To the extent that it doesn't compromise cleanup activities, spills shall be covered and protected from stormwater runoff during rainfall.
2. Spills shall not be buried or washed with water.
3. Used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose shall be stored and disposed of in conformance with BMP CN-105: Hazardous Waste Management.
4. Water used for cleaning and decontamination shall not be allowed to enter storm drains or watercourses and shall be collected and disposed of in accordance with BMP CN-105: Hazardous Waste Management.
5. Water overflow or minor water spillage shall be contained and shall not be allowed to discharge into drainage facilities or watercourses.

6. Proper storage, clean-up and spill reporting instruction for hazardous materials stored or used on the project site shall be posted at all times in an open, conspicuous and accessible location.
7. Waste storage areas shall be kept clean, well-organized and equipped with ample clean-up supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers and liners shall be repaired or replaced as needed to maintain proper function.
8. Verify weekly that spill control and clean up materials are located near material storage, unloading, and use areas.
9. Update spill prevention and control plans and stock appropriate clean-up materials whenever changes occur in the types of chemicals used or stored onsite.

Cleanup and Storage Procedures for Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc., which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Remove the absorbent materials promptly and dispose of properly.
- The practice commonly followed for a minor spill is:
    - Contain the spread of the spill.
    - Recover spilled materials.
    - Clean the contaminated area and/or properly dispose of contaminated materials.

Cleanup and Storage Procedures for Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.
- Clean up spills immediately:
- Notify the project foreman immediately. The foreman shall notify the City's Emergency Management Agency's Hazardous Materials Response Team.
- Contain spread of the spill.
- If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
- If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
- If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Cleanup and Storage Procedures for Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper City officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.

- For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor shall notify the National Response Center at (800) 424-8802.
- Notification shall first be made by telephone and followed up with a written report.
- The services of a spills contractor or a Haz-Mat team shall be obtained immediately. Construction personnel shall not attempt to clean up the spill until the appropriate and qualified personnel have arrived at the job site.

REFERENCE

California Department of Transportation, Construction Site BMP Manual, 2000 or later

BMP CN – 104
SOLID WASTE MANAGEMENT

DESCRIPTION

Solid waste management procedures and practices are designed to minimize or eliminate the discharge of pollutants to the drainage system or to watercourses as a result of the creation, stockpiling, or removal of construction site wastes.

Solid waste management procedures and practices are implemented on all construction projects that generate solid wastes.

Solid wastes include but are not limited to:

1. Construction wastes including brick, mortar, timber, steel and metal scraps, sawdust, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials.
2. Landscaping wastes, including vegetative material, plant containers, and packaging materials.
3. Litter, including food containers, beverage cans, coffee cups, paper bags, plastic wrappers, and smoking materials, including litter generated by the public.

LIMITATIONS

1. Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season.

DESIGN CRITERIA

1. Dumpsters of sufficient size and number shall be provided to contain the solid waste generated by the project and properly serviced.
2. Littering on the project site shall be prohibited.
3. To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines shall be a priority.
4. Trash receptacles with lids shall be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
5. Construction debris and litter from work areas within the construction limits of the project site shall be collected and placed in watertight dumpsters at least weekly regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris shall not be placed in or next to drain inlets, stormwater drainage systems or watercourses.
6. Full dumpsters shall be removed from the project site and the contents shall be disposed of, off-site, in an appropriate manner.;
7. Litter stored in collection areas and containers shall be handled and disposed of by trash hauling contractors.
8. Construction debris and waste shall be removed from the site every two weeks.
9. Stormwater run-off shall be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
10. Solid waste storage areas shall be located at least 50 ft. from drainage facilities and watercourses and shall not be located in areas prone to flooding or ponding.

11. Except during fair weather, construction and landscaping waste not stored in watertight dumpsters shall be securely covered from wind and rain by covering the waste with tarps, plastic sheeting, or equivalent.
12. Dumpster washout on the project site is not allowed.
13. Notify trash hauling contractors that only watertight dumpsters are acceptable for use on-site.
14. Plan for additional containers during the demolition phase of construction.
15. Plan for more frequent pickup during the demolition phase of construction.
16. Construction waste shall be stored in a designated area. Access to the designated area shall either be well vegetated ground, a concrete or asphalt road or drive, or a gravel construction entrance, to avoid mud tracking by trash hauling contractors.
17. Segregate potentially hazardous waste from non-hazardous construction site waste.
18. Keep the site clean of litter debris.
19. Make sure that toxic liquid wastes (e.g., used oils, solvents, and paints) and chemicals (e.g., acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
20. For disposal of hazardous waste, see BMP CN-105: Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
21. Salvage or recycle useful vegetation debris, packaging and/or surplus building materials when practical. For example, trees and shrubs from land clearing can be converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.
22. Prohibit littering by employees, subcontractors, and visitors.
23. Wherever possible, minimize production of solid waste materials.

REFERENCE

California Department of Transportation, Construction Site BMP Manual, 2000 or later

BMP CN – 105
HAZARDOUS WASTE MANAGEMENT

DESCRIPTION

These are procedures and practices to minimize or eliminate the discharge of pollutants from construction site hazardous waste to the storm drain systems or to watercourses.

This best management practice (BMP) applies to all construction projects.

Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products,
- Asphalt Products,
- Concrete Curing Compounds,
- Pesticides,
- Acids,
- Paints,
- Stains,
- Solvents,
- Wood Preservatives,
- Roofing Tar, or
- Any materials deemed a hazardous waste in 40 CFR Parts 110, 117, 261, or 302.

DESIGN CRITERIA

Storage Procedures

1. Wastes shall be stored in sealed containers constructed of a suitable material and shall be labeled as required by 49 CFR Parts 172,173, 178, and 179.
2. All hazardous waste shall be stored, transported, and disposed as required in 49 CFR 261-263.
3. Waste containers shall be stored in temporary containment facilities that shall comply with the following requirements:
   - Temporary containment facility shall provide for a spill containment volume able to contain precipitation from a 24-hour, 25-year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
   - Temporary containment facility shall be impervious to the materials stored there for a minimum contact time of 72 hours.
   - Temporary containment facilities shall be maintained free of accumulated rainwater and spills. In the event of spills or leaks accumulated rainwater and spills shall be placed into drums after each rainfall. These liquids shall be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids shall be sent to an approved disposal site.
   - Sufficient separation shall be provided between stored containers to allow for spill cleanup and emergency response access.
   - Incompatible materials, such as chlorine and ammonia, shall not be stored in the same temporary containment facility.

- Throughout the rainy season, temporary containment facilities shall be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs. A storage facility having a solid cover and sides is preferred to a temporary tarp. Storage facilities shall be equipped with adequate ventilation.

4. Drums shall not be overfilled and wastes shall not be mixed.
5. Unless watertight, containers of dry waste shall be stored on pallets.
6. Paint brushes and equipment for water and oil based paints shall be cleaned within a contained area and shall not be allowed to contaminate site soils, watercourses or drainage systems. Waste paints, thinners, solvents, residues, and sludge that cannot be recycled or reused shall be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths shall be disposed of as solid waste.
7. Ensure that adequate hazardous waste storage volume is available.
8. Ensure that hazardous waste collection containers are conveniently located.
9. Designate hazardous waste storage areas on site away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
10. Minimize production or generation of hazardous materials and hazardous waste on the job site.
11. Use containment berms in fueling and maintenance areas and where the potential for spills is high.
12. Segregate potentially hazardous waste from non-hazardous construction site debris.
13. Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.
14. Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
15. Place hazardous waste containers in secondary containment.
16. Do not allow potentially hazardous waste materials to accumulate on the ground.
17. Do not mix wastes.

<u>Disposal Procedures</u>

1. Waste shall be removed from the site within 90 days of being generated.
2. Waste shall be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
3. A certified laboratory shall sample waste and classify it to determine the appropriate disposal facility.
4. Make sure that toxic liquid wastes (e.g., used oils, solvents, and paints) and chemicals (e.g., acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for solid waste construction debris.
5. Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
6. Recycle any useful material such as used oil or water-based paint when practical.

<u>Maintenance and Inspection</u>

1. A foreman and/or construction supervisor shall monitor on-site hazardous waste storage and disposal procedures.
2. Waste storage areas shall be kept clean, well-organized, and equipped with ample clean-up supplies as appropriate for the materials being stored. Storage areas shall be inspected in conformance with the provisions in the contract documents.
3. Perimeter controls, containment structures, covers, and liners shall be repaired or replaced as needed to maintain proper function.

4. Hazardous spills shall be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.
5. The National Response Center, at (800) 424-8802, shall be notified of spills of Federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302.
6. Copy of the hazardous waste manifests shall be provided to the owner.

REFERENCE

California Department of Transportation, Construction Site BMP Manual, 2000 or later.

MADISON Indiana
Planning, Preservation and Design

101 W Main St
Madison, IN 47250
(812) 265-8324

Notice of Appeal

Ad Fee (for Legal Notice) ~~$15.00~~

Paper applications will be accepted by the Office of Planning, Preservation, and Design; however, electronic submissions through our Permit Portal are preferred. This application can be submitted electronically at www.madison-in.gov/reporting.

Purpose: Per the City of Madison Zoning Ordinance, appeals to the ~~Board of Zoning Appeals~~ BPW concerning interpretation or administration of this ordinance may be taken by any persons aggrieved, or by any officer or bureau of the legislative authority of the City affected by any decision of the Building Inspector. Such appeal shall be taken within twenty (20) days after the decision by filing with the Building Inspector and the ~~Board of Zoning Appeals~~ BPW a notice of appeal specifying the grounds upon which the appeal is being taken.

This notice must be filed at least 15 days prior to scheduled meeting to be eligible for consideration at that meeting. Actual deadlines vary due to holidays, office business hours and operating schedule, media publishing deadlines, etc. Deadlines are published publicly and can also be provided by contacting the Planning Office.

APPLICANT INFORMATION

Date: 8/21/25

Name of person or organization requesting the appeal: Derin VanWye

Mailing Street Address: 519 Highland Dr.

City: Madison State: IN Zip: 47250

Phone (Preferred): 812-493-4782 Email: _____

PROPERTY OWNER (☑ Check here if Applicant is also Property Owner)

Name of person or organization that owns the subject property: _____

Street Address: _____

City: _____ State: _____ Zip: _____

Parcel ID (can be obtained from the office): _____

APPEAL INFORMATION

Date of Decision Being Appealed: _____

Decision Making Entity:

- ☐ Plan Commission
- ☐ Board of Zoning Appeals
- ☒ Code Enforcement
- ☐ Planning Director/Department
- ☐ Building Inspector

Docket ID of Decision Being Appealed, if applicable: _____

APPLICANT'S REASON(S) FOR APPEAL

1- Didn't recieve proper notice, before anything was done to start with.

2- Amount on paper or stated amount is completly & totally astronomical for what was done. Now way could the amount be proper.

I feel legally ripped off

Include any other documents/information which you feel will aid the Board in making its determination.

Certified letters MUST be mailed to adjoining property owners (includes owners of real estate at corners, across streets, alleys or easements as well as others who may share a common boundary) at least ten (10) days prior to the meeting. The Planning Office can assist you in obtaining this information. Proof of the Certified Mail receipts and the corresponding returned green cards shall be given to the Planning Office at least one (1) working day prior to the scheduled meeting. The Board will not review the application unless these are received.

I certify that the information provided in this application is true and accurate to the best of my ability and I understand and agree to the Certified mail stipulations.

8/21
Date

Signature of Applicant

COMPLETED BY PLANNING OFFICE

Notice Accepted on: _____

Notice Accepted by: _____

Meeting Information: Sept 7, 2023

101 W Main St, Madison, IN 47250 – Council Chambers

Meeting Date: _____ Time: ~~6:00PM~~

Documentation Review (Completed by Planning Office)

____ Application is complete
____ GIS Information to applicant and attached
____ Certified Mail Receipts received (attach)
____ Certified Mail Green Cards received (attach)

Staff Notes

MADISON Indiana
Planning, Preservation and Design

NOTICE OF LIEN

August 13th, 2025

To: Derin & Valeria Vanwye
519 Highland Dr
Madison, IN 47250

REFERENCE ADDRESS:
519 Highland Dr
Madison, IN 47250

The City of Madison, Indiana intends to hold a LIEN pursuant to Indiana Code Section 36-1-6-2 and 96.02 of the Municipal Code of the City of Madison, as from time to time amended, upon the following described real estate located in Jefferson County, State of Indiana, to-wit: *519 Highland Dr., Madison, IN. 47250*.

For the claim for trash clean-up and removal; on August 6, 2025 (25-275)

The amount of $1019.70 is payable in full (20) days from the date of this Notice.

Failure to pay the $1019.70 will result in a Lien being filed which will include: City fine - $150.00; lien filing fee - $25.00; lien release fee - $25.00; two (2) mailings - $.74 & $10.44 ($11.18) Total Lien will be $1230.88.

STATE OF INDIANA)
) SS:
COUUNTY OF JEFFERSON)

The undersigned being first duly sworn upon oath disposes and says that the facts set forth in the foregoing notice are true to the best of his/her knowledge and belief and the undersigned acknowledges execution of the foregoing instrument on the 13th day of August 2025.

Duane E. O'Neal.

Duane Edward O'Neal, Code Enforcement Officer

Subscribed and sworn to before me, a Notary Public in and for said County and State this 13th day of August 2025, and personally appeared before me, Duane Edward O'Neal, and acknowledged execution of the foregoing instrument this 13th day of August 2025.

My Commission expires: 6/26/30

Nicole M Schell

Nicole M Schell, Notary Public

NOTARY PUBLIC SEAL INDIANA
NICOLE M SCHELL
Notary Public, State of Indiana
Jefferson County
Commission Number NP0742016
My Commission Expires
June 26, 2030

NUIV-25-275

Nuisance Violation Report Form

Status: Active

Submitted On: 7/24/2025

Primary Location

519 HIGHLAND DR
MADISON, IN 47250

Owner

Vanwye Derin & Valeria
HIGHLAND DR 519 MADISON, IN 47250

Applicant

Duey O'Neal
812-274-0428
doneal@madison-in.gov
101 W Main St
Madison, IN 47250

Personal Information of Person Filling out Report

Name

Street

City

State

Zip Code

Phone (Preferred)

Phone (Alternate)

Email

Nuisance Information

Provide a detailed description of the location of the nuisance on the property*

Front yard.

Violation Information

Type of Violation

Garbage, Trash, Yard Waste

Define Violation

Type of Violation

Unclean, Disorderly Premises

Define Violation

Acknowledgement

It is the policy of the City of Madison, Indiana, not to disclose personal, identifying information of residents who file a Nuisance Violation Report Form. However, please note that all information included in this Nuisance Violation Report Form is subject to disclosure under the Indiana Access to Public Records Act. Therefore, if a formal request for copies of these Public Records is made, please be aware no redactions of personal information is required or permitted by Indiana law.

By signing below, I acknowledge that I have read, understood, and consent to the above.

I acknowledge the above*

☑

Attachments

Contractor's Invoice
ContInvoice (25-274) (25-267) (25-275).pdf
Uploaded by Duey O'Neal on Aug 7, 2025 at 9:59 AM

Notice of Lien
Highland Dr 519 NotOfLien (25-275).docx
Uploaded by Duey O'Neal on Aug 7, 2025 at 10:09 AM

Site Inspection

TC_05320.JPEG
Uploaded by Duey O'Neal on Jul 24, 2025 at 10:59 AM

Record Activity

Duey O'Neal started a draft Record	07/24/2025 at 10:56 am
Duey O'Neal submitted Record NUIV-25-275	07/24/2025 at 10:59 am
OpenGov system altered inspection step Site Inspection, changed status from Inactive to Active on Record NUIV-25-275	07/24/2025 at 10:59 am
OpenGov system assigned inspection step Site Inspection to Duey O'Neal on Record NUIV-25-275	07/24/2025 at 10:59 am
Duey O'Neal altered inspection step Site Inspection, changed status from Active to Complete on Record NUIV-25-275	07/24/2025 at 10:59 am
OpenGov system altered inspection step Re-Inspection, changed status from Inactive to Active on Record NUIV-25-275	07/24/2025 at 10:59 am
OpenGov system completed document step Notice of Nuisance or Violation on Record NUIV-25-275	07/24/2025 at 10:59 am
OpenGov system assigned inspection step Re-Inspection to Duey O'Neal on Record NUIV-25-275	07/24/2025 at 10:59 am
OpenGov system changed the deadline to Jul 29, 2025 on inspection step Re-Inspection on Record NUIV-25-275	07/24/2025 at 10:59 am
Duey O'Neal changed form field entry Work Order Type from "" to "General" on Record NUIV-25-275	07/31/2025 at 7:00 am
Duey O'Neal changed form field entry Number of Violation from "" to "1" on Record NUIV-25-275	07/31/2025 at 7:00 am
Duey O'Neal changed form field entry Will a Work Order be Needed? from "" to "Yes" on Record NUIV-25-275	07/31/2025 at 7:00 am

Duey O'Neal altered inspection step Re-Inspection, changed status from Active to Complete on Record NUIV-25-275	07/31/2025 at 7:00 am
OpenGov system completed document step General Work Order Issued/Assigned on Record NUIV-25-275	07/31/2025 at 7:00 am
OpenGov system altered approval step Work Order Completed, changed status from Inactive to Active on Record NUIV-25-275	07/31/2025 at 7:00 am
OpenGov system assigned approval step Work Order Completed to Duey O'Neal on Record NUIV-25-275	07/31/2025 at 7:00 am
Duey O'Neal changed form field entry Completion Due Date from "" to "08/06/2025" on Record NUIV-25-275	07/31/2025 at 7:01 am
Duey O'Neal changed form field entry Date Work Order Is Issued from "" to "07/31/2025" on Record NUIV-25-275	07/31/2025 at 7:01 am
Duey O'Neal changed form field entry Name of Contractor from "" to "Ralston Renovations" on Record NUIV-25-275	07/31/2025 at 7:01 am
Duey O'Neal changed form field entry Work Order Notes from "" to "<p style="box-sizing: border-box; margin: 0px 0px 10px;"><span style="color: rgb(19, 21, 23); fon..." on Record NUIV-25-275	07/31/2025 at 7:01 am
Duey O'Neal changed the deadline to Aug 6, 2025 on approval step Work Order Completed on Record NUIV-25-275	07/31/2025 at 7:01 am
Duey O'Neal changed form field entry LIEN Needed? from "" to "Yes" on Record NUIV-25-275	08/07/2025 at 9:57 am
Duey O'Neal approved approval step Work Order Completed on Record NUIV-25-275	08/07/2025 at 9:58 am
OpenGov system altered payment step Payment of Nuisance Violation Fees, changed status from Inactive to Active on Record NUIV-25-275	08/07/2025 at 9:58 am
Duey O'Neal changed the deadline to Sep 3, 2025 on payment step Payment of Nuisance Violation Fees on Record NUIV-25-275	08/07/2025 at 9:58 am
Duey O'Neal altered approval step Notice of LIEN, changed status from Inactive to Complete on Record NUIV-25-275	08/07/2025 at 9:58 am
Duey O'Neal added file ContInvoice (25-274) (25-267) (25-275).pdf to Record NUIV-25-275	08/07/2025 at 9:59 am
Duey O'Neal added file Highland Dr 519 NotOfLien (25-275).docx to Record NUIV-25-275	08/07/2025 at 10:09 am

Timeline

Label	Activated	Completed	Assignee	Due Date	Status
Site Inspection	7/24/2025, 10:59:02 AM	7/24/2025, 10:59:34 AM	Duey O'Neal	-	Completed
Notice of Nuisance or Violation	7/24/2025, 10:59:34 AM	7/24/2025, 10:59:34 AM	-	-	Completed
Re-Inspection	7/24/2025, 10:59:34 AM	7/31/2025, 7:00:33 AM	Duey O'Neal	7/29/2025	Completed
General Work Order Issued/Assigned	7/31/2025, 7:00:33 AM	7/31/2025, 7:00:33 AM	-	-	Completed
Work Order Completed	7/31/2025, 7:00:33 AM	8/7/2025, 9:58:21 AM	Duey O'Neal	8/6/2025	Completed
Payment of Nuisance Violation Fees	8/7/2025, 9:58:22 AM	-	Duey O'Neal	9/3/2025	Active
Notice of LIEN	-	8/7/2025, 9:58:49 AM	-	-	Completed
Filing of LIEN	-	-	-	-	Inactive
Payment of Nuisance Lien Fees	-	-	Duey O'Neal	-	Inactive
Release of LIEN	-	-	-	-	Inactive

Pending Approval

Estimate #EST-8362

Estimate Date: Aug 6, 2025

Learn more about us at: Ralstonrenovations.com

Business Information

Ralston Renovations

Address:

Email: Landon@ralstonrenovations.com

Phone: 8124934533

License Number: 10297

Project Breakdown

519 Highland Avenue Cleanup:
Remove all trash and waste from the property
Clean out vehicle filled with trash and debris
Remove and dispose of 3 tires
Load and haul all collected waste to appropriate disposal facilities
Dispose of general trash at landfill
Dispose of tires at recycling facility

Costs Table

Item Description	Unit Price	Total
Waste Removal/cleanup		
Labor		$600.00
Labor Quantity: 8	$75.00	$600.00
Material		$327.00
Work Gloves Quantity: 4	$8.00	$32.00
Heavy Duty Trash Bags Quantity: 3	$25.00	$75.00
Disposal Fees Quantity: 2	$75.00	$150.00

Approve

Download

Quantity: 2.0

Other

Other		$92.70
Markup	10.00%	$92.70

Sub Total	$1,019.70
Total	**$1,019.70**

Notes:
519 Highland Avenue Remove trash and waste from the property. clean out the vehicle filled with trash and remove 3 tires. Dispose of all waste and trash and tires

Sign Here

Draw T Type

Draw your signature here

Full Name *

Email Address *


Network: Jul 24, 2025 at 9:46:01 AM ED
Local: Jul 24, 2025 at 9:46:01 AM ED
N 38° 46' 3.393", W 85° 23' 49.795
515 Highland D
Madison IN 4725
United State

MADISON Indiana
Planning, Preservation and Design

101 W Main St
Madison, IN 47250
(812) 265-8324

PACE Total Approval

_____ has been approved by the Board of Public Works to receive a PACE grant for _____ (amount) for the project at _____ (address)

_____ Signature (PACE Program Staff) _____ Date

_____ Signature (Mayor) _____ Date

_____ Signature (Board of Public Works and Safety) _____ Date

_____ Signature (Board of Public Works and Safety) _____ Date

PACE Midpoint Check

I, Foster Mefford (Print Name), received a check for $ 3750.00 (amount) from the PACE grant for the project at 821 Walnut St. (project address).

[signature] Signature (Applicant) 7-24-25 Date

Brenna R. Haley Signature (PACE Program Staff) 7-7-25 Date

[signature] Signature (Mayor) 7-7-25 Date

David Carlow Signature (Board of Public Works and Safety) 7-7-2025 Date

Karl Eagle Signature (Board of Public Works and Safety) 7-7-2025 Date

PACE Final Check

I, Foster Mefford (Print Name), received a check for $3750.00 (amount) from the PACE grant for the project at 821 Walnut St. (project address).

_____ Signature (Applicant) _____ Date

_____ Signature (PACE Program Staff) _____ Date

_____ Signature (Mayor) _____ Date

_____ Signature (Board of Public Works and Safety) _____ Date

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PACE
Grant Approval

Property Address: 821 Walnut St.

Applicant Name(s): Foster Mefford

P.A.C.E. Review Committee

Date of approval: 1/14/2025

PACE Program Staff: Brenna R. Haley

Grant Amount Approved: $7500.00

Mayor

Date of approval: 1-21-25

Mayor: [signature]

Board of Public Works and Safety

Date of approval: 1-21-25

Board of Public Works and Safety Representative: [signature]

Date of approval: 1-21-2025

Board of Public Works and Safety Representative: [signature]

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P.A.C.E. Preservation & Community Enhancement Grant Program Final Report

Purpose: Application is hereby made to request the funding from the PACE Program. **Forms must be accompanied by at least four photos showing the progress and one photo of the front of the building. Copies of all paid invoices and receipts must also be submitted. If a Midpoint Report was submitted, only paid invoices and receipts after that report are required to be submitted with this form.**

APPLICANT INFORMATION

Date: 9-11-25

Property Owner Name: Foster Mefford & Jackson Stockdale

Mailing Street Address: 411 West First Street

City: Madison State: IN Zip: 47250

Phone (Preferred): 8124933883 Phone (Alternate): 8128011257

Email: Fostermeff@yahoo.com

PROJECT INFORMATION

Street Address: 821 Walnut Street

Total Cost of Project (include all costs to complete the entire project): 90k

Estimated Date of Completion of Work: 5-1-26

☐ Hilltop ☑ Downtown

GRANT INFORMATION

☑ Rehabilitation (Downtown) Grant ☐ Curb Appeal (Hilltop) Grant ☐ Dilapidated Structures Grant ☐ Dangerous Buildings Grant

Total Amount of Grant Awarded (can be obtained from the office):

Was a midpoint report submitted for this project? ☑ Yes ☐ No

DESCRIPTION OF THE PROJECT

Please describe the project elements that have been completed. If a midpoint report was submitted, only include the list of project elements completed since that report was submitted.

~~Since the Completion of the midpoint we have ordered and installed our windows, put gutters on and finsihed our Exterior door.~~

☐ Additional pages are attached.

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DETAILED PROJECT BUDGET WORKSHEET

List all major tasks that have been complete of the Project. The P.A.C.E. Grant Program funds materials and labor. Please separate materials from labor. If a midpoint report was submitted, only include the tasks completed since that report was submitted.

Task #	Description of Work and/or Material Please Reference Appropriate Quote (Must be attached)	Total Task Cost	Amount of Grant Funds (50% max)
	SAMPLE: Lumber and supplies per sales ad from Lowe's	$1,076	$538.00
1	Window Installation ($200 each) 6 windows	$1200	
2	Gutters (Can Do Maintence)	$600	
3	Tuck pointing for the windows	$300	
4			
5			
6			
7			
8			
9			
10			
11			
12			
	Totals		

☐ Additional pages are attached.

I certify that the project was completed and that all required documents are included in my final report packet.

Applicant(s) Signature 9-11-25 **Date**

CAN DO MAINTENANCE

714 JEFFERSON STREET
MADISON, IN 47250
+18122740800
bcjohnson20@yahoo.com

INVOICE

BILL TO
Foster Mefford
819 Walnut Street
Madison, IN 47250
812-493-3883

INVOICE	1633
DATE	12/17/2024
TERMS	Due on receipt
DUE DATE	12/17/2024

DESCRIPTION	QTY	RATE	AMOUNT
Owens Corning® Oakridge®	1	4,000.00	4,000.00
REMOVE ALL SHINGLES ON ROOF AND REPLACE WITH Owens Corning® Oakridge® Series Shingles Install Owens Corning®or Rhino 20 Synthetic Felt Install Owens Corning® Starter Strip at eaves and rake edges WeatherLock®G Granulated Self-Sealing Ice & Water Barrier in valleys Install NEW ventilation on building(750 Box Vents or Ridge Vent)as recommended INSTALL NEW pipe boot Roof Flashings INSTALL NEW Owens Corning® ProEdge® Hip&Ridge Shingles on Ridge INSTALL NEW Aluminum Drip Edge at Eaves and rake edges INSTALL NEW Step Flashing (where applicable) INSTALL NEW Counter Flashing (where applicable) CLEAN UP and HAUL AWAY OUR DEBRIS			
EXTRA CHARGE $68.50/sheet FOR SHEETING THAT NEEDS REPLACED		1,200.00	1,200.00
DEPOSIT 12/2/2024 Check # 1064			-2,000.00

TERMS: Remaining balance due upon receipt of invoice. 1% Service Charge will be added every 2 weeks past due.

BALANCE DUE **$3,200.00**

CAN DO MAINTENANCE

714 JEFFERSON STREET
MADISON, IN 47250
+18122740800
bcjohnson20@yahoo.com

Estimate

ADDRESS
Foster Mefford
819 Walnut Street
Madison, IN 47250
812-493-3883

ESTIMATE	1899
DATE	11/19/2024
EXPIRATION DATE	12/19/2024

DESCRIPTION	QTY	RATE	AMOUNT
Owens Corning® Oakridge® REMOVE ALL SHINGLES ON ROOF AND REPLACE WITH Owens Corning® Oakridge® Series Shingles Install Owens Corning®or Rhino 20 Synthetic Felt Install Owens Corning® Starter Strip at eaves and rake edges WeatherLock®G Granulated Self-Sealing Ice & Water Barrier in valleys Install NEW ventilation on building(750 Box Vents or Ridge Vent)as recommended INSTALL NEW pipe boot Roof Flashings INSTALL NEW Owens Corning® ProEdge® Hip&Ridge Shingles on Ridge INSTALL NEW Aluminum Drip Edge at Eaves and rake edges INSTALL NEW Step Flashing (where applicable) INSTALL NEW Counter Flashing (where applicable) CLEAN UP and HAUL AWAY OUR DEBRIS *EXTRA CHARGE $68.50/sheet FOR SHEETING THAT NEEDS REPLACED*	1	4,000.00	4,000.00
INSTALL 6" GUTTERS AND REPLACE ALL DOWNSPOUTS WITH 3X4 DOWNSPOUTS COLOR: BLACK	1	600.00	600.00

*******Estimates are good for 30 days.
50% due before works begins.********
Payments may be mailed in, brought to office or left in drop box at front of building.

TOTAL **$4,600.00**

Accepted By

Accepted Date


821
WALNUT STREET
823


821
WALNUT STREET
823