


APPENDIX B4
HIGHWAY OCCUPANCY PERMIT
STORM WATER FACILITY
GUIDEBOOK

pennsylvania
DEPARTMENT OF TRANSPORTATION

Pennsylvania Department of Transportation

December 2011

Publication 282- Highway Occupancy Permit Guidelines

TABLE OF CONTENTS

APPENDICES:

HOW TO USE THIS BOOK

The Storm Water Facility Guidebook *provides guidance on who should be the applicant for storm water installation as part of Highway Occupancy Permit work, alternatives to including the local government as an applicant, and how to prepare an agreement between developer and local government should the local government be an applicant.*

Purpose

Why is this guidebook needed?

This guidebook has been prepared to assist designers, local governments, and landowners with projects that require installation of storm water facilities and/or modifications to existing storm water facilities during the Highway Occupancy Permit (HOP) process. A policy addressing such facilities was issued on June 24, 2010, by Strike-Off-Letter (SOL) 470-10-03 (HOP policy). The HOP policy discusses modifications to Chapter 5.1 (Storm Water Facility Maintenance – Responsibility) of PennDOT Publication 282 (HOP Manual) as further revised and updated in December 2011 as set forth herein.

In some instances, the law requires that the local government in which an HOP project is located must be the permittee or co-permittee with the landowner for enclosed surface storm water facilities. The HOP policy provides an avenue to local governments for landowners to fund future maintenance. This guidebook explains the five categories of HOP-installed or modified facilities and which categories require the local government to be a co-permittee.

This guidebook also provides possible alternative storm water designs for landowners and local governments to consider when designing an HOP project to create situations where the local government will not need to be a co-permittee. For those local governments that agree to take on maintenance responsibilities, the HOP policy provides that the landowner is responsible for providing funding to the local government to offset future maintenance costs. In the alternative, a local government may consider requesting security for future costs as part of land development review.

Why is Storm Water Maintenance important?

In previous presentations and policy on the subject matter, “open surface storm water facilities” were referred to as “surface storm water facilities”, and “enclosed surface storm water facilities” was referred to as “subsurface storm water facilities.” Moving forward, to be consistent with the Department’s Maintenance Manual, Publication 23, the Department will use the terms “open surface storm water facilities” and “enclosed surface storm water facilities.”

Identifying storm water maintenance responsibilities is of high importance for every HOP project. The maintenance of storm water facilities is required to achieve the full expected life from facilities and to protect the travelling public from hazards related to ill-performing storm water systems. A functioning storm water infrastructure is critical to support the movement of goods, people, and services on State highways.

The HOP policy is beneficial to all parties, including the state tax payer. It provides an opportunity to have landowners, who are altering land for their purposes, fund maintenance of enclosed surface storm water facilities (as opposed to PennDOT or local governments). Additionally, the policy allows all involved parties an opportunity to provide input towards the ultimate design solution.

Purpose

Who is responsible for Storm Water Maintenance?

The permittee is responsible for maintenance of storm water facilities under an HOP. The term maintenance includes routine maintenance as well as repair, replacement, and reconstruction when necessary.

Quick Definition Reference:

"Local governments": townships, cities, boroughs, incorporated towns, home rule municipalities, and counties

"**Open surface storm water facilities**": Ditches, swales, gutters, roadway crowns, shoulders, and curbs.

"**Enclosed surface storm water facilities**": Storm water cross pipes/culverts and parallel pipes/culverts including any attached inlets, headwalls, and end walls.

Section 421 of State Highway Law, 36 P.S. § 670-421, states:

"It is unlawful for any person to discharge sewage or drainage, except surface drainage, on, or within the legal limits of, any State highway."

State Highway Law & the HOP Policy

Ideally, every new development should retain site development storm water runoff on their property; however, this is not always practical or possible. PennDOT has historically interpreted the surface water drainage allowed under Section 421 of the State Highway Law [see sidebar] to be surface/sheet flow only; concentrating water and directing it into a State highway is not surface drainage and thus not allowed, even by HOP, except in limited circumstances. PennDOT has long recognized an exception to Section 421 for surface storm water facilities draining a proposed driveway because landowners abutting non-limited access highways have a constitutional right of access that may be impeded if drainage at a driveway could not flow onto the highway (Category #1).

For purposes of drainage in connection with driveways and local roads, PennDOT now considers open surface storm water facilities, whether connected to a highway drainage facility or not, as surface drainage under Section 421 and therefore permissible by HOP. This allows applicants other than a local government to be the sole permittee for such open surface facilities (Category #2). PennDOT also now recognizes an exception to Section 421 for local governments due to their public nature, their historic and statutory responsibility for storm water management within their geographic boundaries, and their review and approval of land development plans. These reviews and approvals frequently include storm water management. This allows permits to be issued to local governments for enclosed storm water facilities connected to highway drainage facilities (Category #3) and enclosed storm water facilities draining the highway and/or adjacent properties (Category #4).

PennDOT has the discretion to deny an application to permit modifications to an existing highway drainage system to accommodate an abutting landowner, except as necessary to accommodate the constitutional right of access. PennDOT is only obligated to accept surface/sheet flow under the common enemy rule applicable in Pennsylvania; it is not obligated to accept water that has been collected and channeled for general land development purposes. PennDOT may do so by HOP, however, within its discretion for economy of maintenance as well as supporting land development

Local governments should consider entering into agreements with the landowners developing their land to address future maintenance of storm water facilities. A sample agreement outlining responsibility for maintenance as well as funding and security in that regard can be found by following the link on Page 15 of this guidebook.

Policy References

The policy is consistent with the State Highway Law, PA Code, Title 67, Chapters 441 & 459 and PennDOT's general maintenance policy. The design of storm water facilities should be completed in accordance with the following publications:

- PennDOT Publication 584- Drainage Manual
- PennDOT Publication 408- Highway Construction Specifications
- PennDOT Publication 13M- Design Manual 2, Chapter 10
- PennDOT Publication 23- Maintenance Manual
- PennDOT Publication 72M- Roadway Construction Standards
- DEP Protocol Municipal Separate Storm Sewer System (MS4) Storm Water Management Program

Storm Water Facility Categories

1

The five different storm water facility scenarios identified in the HOP policy are referenced in this HOP Guidebook as Storm Water Facility Categories to be consistent with previous presentation on this subject matter. A summary of each of the storm water categories is as follows:

1. ***Open or enclosed surface storm water facilities draining or conveying drainage under a proposed driveway or local road.***
   Systems under this storm water facility category are appurtenant to and serve the driveway or local road as opposed to the land being developed. The driveway or local road applicant is the permittee in this situation.

2. ***Open surface storm water facilities draining more than a proposed driveway or local road, whether connected to a highway storm water facility or not.***
   Systems under this storm water facility category service development of the land in general and typically are not under or directly adjacent to the driveway or local road. They may connect to a highway storm water facility. The driveway or local road applicant is the permittee for these open surface storm water facilities, but local government approval is required if a local ordinance addressing storm water exists. If a local ordinance does not exist, county government should be consulted to determine if there are any county imposed requirements for which approval must be obtained from the county.

3. ***Enclosed surface storm water facilities draining more than a proposed driveway or local road and physically or hydraulically connected to an existing or new highway drainage facility.***
   Systems under this storm water facility category service development of the land in general and are connected to an existing or new highway storm water facility. The local government must be the applicant or a co-applicant with the landowner for these enclosed surface storm water facilities. An agreement between the landowner and the local government addressing funding for the future maintenance is recommended.

4. ***New or modified enclosed surface storm water facilities draining the highway and/or adjacent properties.***
   Systems under this storm water facility category service development of the land in general and drain water away from the highway as opposed to Category 3 facilities that drain into the right-of-way. The facilities are often needed due to roadway improvements such as curbing and roadway widening. The local government must be the applicant or a co-applicant with the landowner for these enclosed surface storm water facilities. An agreement between the landowner and the local government addressing funding for future maintenance is recommended.

5. ***Enclosed surface storm water facilities not connected to a highway drainage facility.***
   Systems under this storm water facility category are not connected to PennDOT's drainage facilities, but cross into PennDOT right-of-way. Either the landowner or the local government can be the permittee for these

enclosed surface storm water facilities, provided the applicant can demonstrate the system directly or indirectly serves the public and is thus a utility facility.

The co-applicant requirements for local governments of Categories 3 and 4 can be avoided by using one of the "Alternative Designs" outlined in Chapter 2. An HOP would still be required for the installation, but the landowner can be the permittee.

Utility Qualification

To satisfy the conditions of Drainage Category 5, the property owner must meet the requirements of a utility facility as defined in the PA Code Chapter 459 **Occupancy of Highways by Utilities**. A utility facility is defined as "*privately, publicly or cooperatively owned lines, facilities and systems for producing, transmitting or distributing communications, power, electricity, light, heat, gas, oil, crude products, coal, water, steam, waste, storm water not connected to Department drainage facilities, and other similar commodities including fire and police signal systems and street lighting systems, which directly or indirectly serve the public or any part thereof.*"

Drainage Release

Obtaining an HOP does not insulate a permittee from liability for impacting downstream owners. Consideration must therefore be given to how open channels and other storm water facilities affect adjacent properties. A drainage release (PennDOT Form M-947) is required from downstream property owners by the HOP applicant for any work increasing, changing or otherwise affecting the volume and/or flow of water over the downstream property, as calculated by using the appropriate design storm outlined in Design Manual 2. An easement or other agreement could also be acceptable to PennDOT. Additional information can be obtained by contacting the local PennDOT Permit Unit.

Cross-Government Application

Sometimes development occurs within one local government that results in storm water facilities being installed within the boundaries of a neighboring local government. If this situation occurs, the local government in which the development occurs may apply under the policy for drainage outside of its boundaries in the neighboring local government.

Developer's Responsibility:

The onus is ultimately on the developer to meet local government ordinances, including storm water ordinances

1.1 Storm Water Facility Category #1

Description: *Open or enclosed surface storm water facilities draining or conveying drainage under a proposed driveway or local road.*

Permittee: *Driveway/local road applicant.*

Agreement: *Not Applicable.*

Examples: *Driveway pipes, culverts, ditches, swales and/or associated surface and enclosed surface facilities under or directly adjacent to the driveway or local road that serve only to drain the driveway or local road.*

Examples of Category #1

Figure 1.1.1- Pipe conveys water under driveway from storm water feature

Figure 1.1.2- Culvert conveys water under driveway.

Figure 1.1.3- Storm water sheet flow across private driveway

1.2 Storm Water Facility Category #2

Description: *Open surface storm water facilities draining more than a proposed driveway or local road, whether connected to a highway storm water facility or not.*

Permittee: *Driveway/local road applicant.*

Agreement: *Not Applicable.*

Examples: *Ditches, curbing, culverts, swales and inlets servicing development of the land in general and typically not under or directly adjacent to the driveway or local road.*

Examples of Category #2

Figure 1.2.1- Storm water conveyed by parallel ditch along road.

Category Assumption:

The ditch was installed to convey site drainage from the abutting property and not highway drainage

Figure 1.2.2- Storm water conveyed by parallel ditch along road.

If the capacity of an existing storm water facility is compromised by increased surface water not from the State highway, PennDOT is authorized under Sections 411 and 420 of the State Highway Law to take appropriate action against the private property owner or local government that caused or failed to prevent the capacity issue, as its issuance authority extends beyond the right-of-way where work may have an adverse effect on the State highway. Capacity is defined as the maximum expected quantity of water, created by a design storm, arriving at a particular location. The applicant is responsible for providing engineering calculations with the Highway Occupancy Permit application that confirm the open channel is able to adequately retain storm water runoff from additional development.

Overflow From Adjacent Land

Figure 1.2.3- A photo of storm water that is not adequately retained and overflow water ponds on the roadway surface.

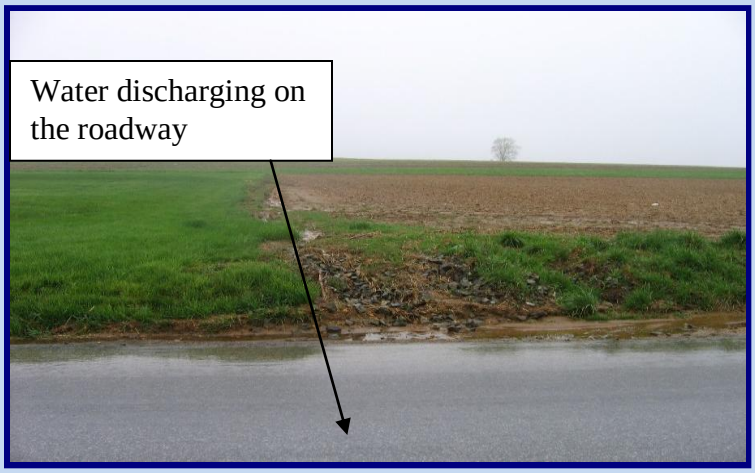


Figure 1.2.4- A photo of storm water that is not adequately retained and overflow water runs off onto the roadway surface

1.3 Storm Water Facility Category #3

Description: *Enclosed surface storm water facilities draining more than a proposed driveway or local road and physically or hydraulically connected to an existing or new highway storm water facility.*

Permittee: *Local government or local government and landowner as co-applicants.*

Agreement: *Recommended.*

Examples: *Pipes servicing development of the land in general and typically not under or directly adjacent to the driveway or local road.*

Examples of Category #3

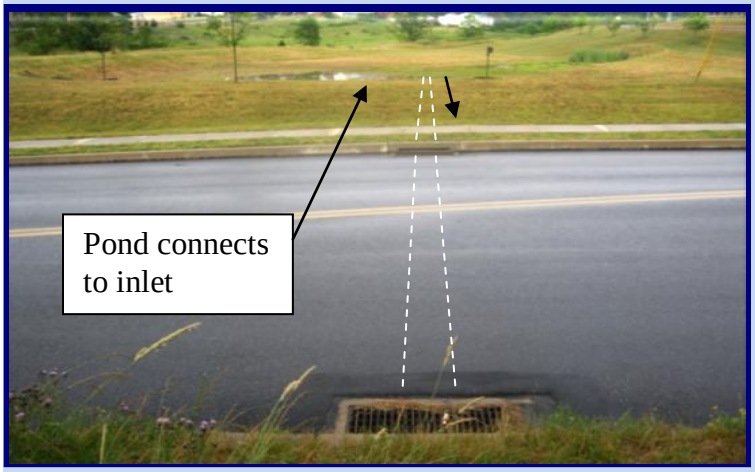


Figure 1.3.1- Site storm water directed into PennDOT Right-of-Way through enclosed surface storm water facilities tied into an existing inlet which is part of a larger drainage system.

Category Assumption:

A cross pipe existed without inlets prior to development.

Figure 1.3.2- Site storm water directed into PennDOT Right-of-Way through enclosed surface storm water facilities tied into an existing inlet which is part of a larger drainage system.

1.4 Storm Water Facility Category #4

Description: *New or modified enclosed surface storm water facilities draining the highway and/or adjacent properties.*

Permittee: *Local government or local government and landowner as co-applicants.*

Agreement: *Recommended.*

Examples: *Enclosed surface storm water facilities created due to the installation of curbing along the highway. This category also includes "city inlets," which are inlets that are placed under the sidewalk and inside of the right-of-way, but drain the highway.*

Examples of Category #4

Figure 1.4.1- New enclosed surface storm water installed with curb gutter as part of widening for right turn lane.

Category Assumption:

The turn lane was installed by developer and the curb/curb gutter is assumed to be required by ordinance.

Figure 1.4.2- New enclosed surface storm water installed with curb gutter as part of widening for left turn lane.

1.5 Storm Water Facility Category #5

Description: *Enclosed surface storm water facilities not connected to a highway storm water facility.*

Permittee: *Property owner or local government.*

Agreement: *Not applicable for property owner but recommended when local government is the applicant.*

Examples: *Pipes servicing development of the land in general that are independent of highway drainage facilities.*

Examples of Category #5

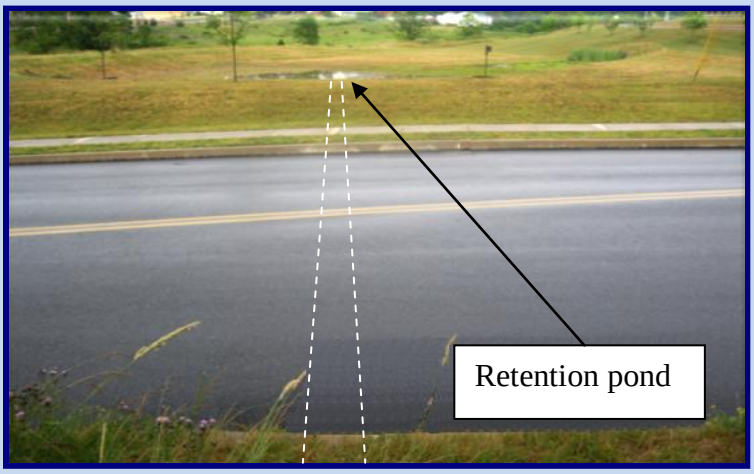


Figure 1.5.1- An example of an enclosed surface storm water facility that drains a retention pond but does not connect to a highway enclosed storm water facility

Category Assumption:

There was no existing cross pipe prior to development.

2 Alternative Storm Water Designs

Local governments may not desire to be an applicant for storm water facilities connected with the development of land abutting a highway. The local government may have limited funding or a limited maintenance crew to utilize for the long-term upkeep of the drainage facilities. PennDOT recognizes these concerns and does not want to hinder development based on the resources of the local government. This is why the HOP policy provides for the placement of ultimate financial responsibility on the landowner when a local government is a co-permittee. Another way to address the long-term maintenance concerns of local governments is to explore alternative drainage designs, preferable early in the design process.

For private development, the use of alternative storm water designs will not require the local government to be a HOP co-applicant. In such cases, the private land owner would be the sole HOP applicant. This section details several storm water design alternatives that can reduce the number of land developments where the local government is required to be a permittee for an HOP. Refer to the PennDOT Drainage Manual (Publication 584), Chapter 14 - Post-Construction Storm Water Management for more information on drainage alternatives. It is important to note that the alternative designs may not apply in all circumstances. Section 14.5 further discusses impervious disconnection.

CHAPTER 2- Alternative Storm Water Designs

2.1 Sample Alternative for Category 3 Projects

Disconnect enclosed surface storm water feature from site.

Figure 2.1.1- Conventional installation where enclosed surface pipe connect to highway drainage facility

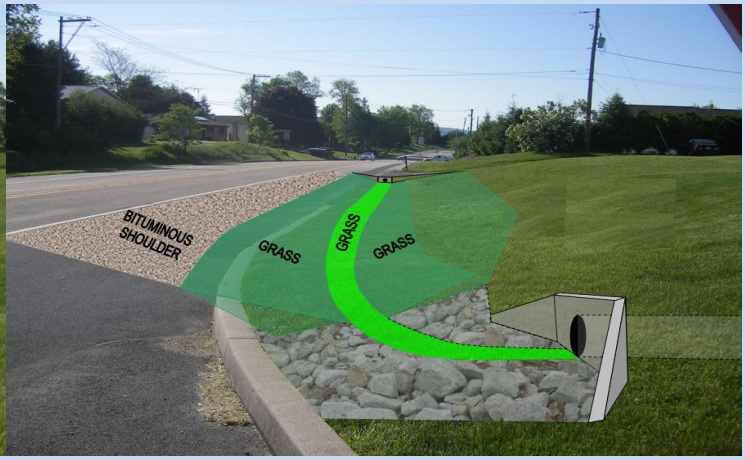


Figure 2.1.2- Alternative installation that utilizes an open surface channel

2.2 Sample Alternative for Category 4 Projects

Eliminate concrete curb gutter and widen road with shoulder and parallel ditch.

Figure 2.2.1- Conventional installation

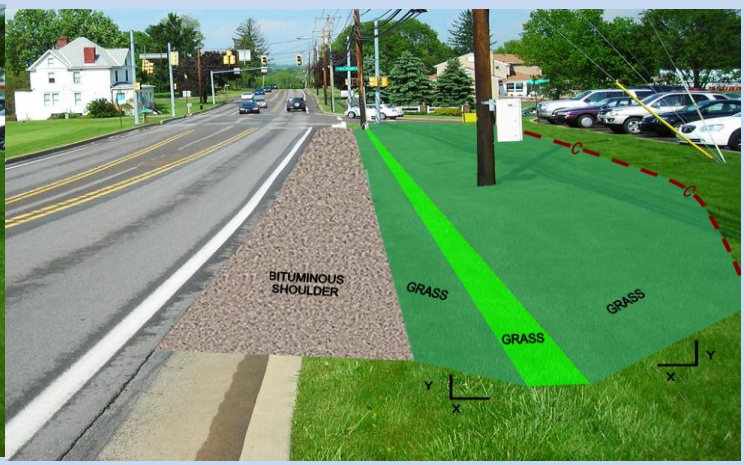


Figure 2.2.2- Alternative installation that utilizes an open surface channel

2.3 Sample Alternative for both Category 3 and 4 Projects

Install curb cut to redirect storm water off the roadway to an infiltration trench off the right-of-way

Figure 2.3.1- Conventional installation

Figure 2.3.2- Alternative installation directs water to an infiltration trench off the right-of-way without the use of inlets and enclosed storm water facilities

Co-Applicant Agreements & Security Options

3

3.1 Co-Applicant Agreements

Description:	*Agreement for maintenance of enclosed surface storm water facilities installed in PennDOT right-of-way and/or connected to PennDOT drainage facilities between property owner and local government. This applies to Drainage Category 3, 4 and 5.*
Property Owner:	*Responsible for design, construction, future maintenance, repair, replacement and reconstruction costs associated with the enclosed surface storm water facilities. Agree to indemnify the Local Government.*
Local Government:	*Has the right to review and make request to the proposed design of the enclosed surface storm water facilities before submission to PennDOT. Agree to be the applicant or co-applicant for the HOP for the enclosed surface storm water facilities. Property Owner to provide funding to the local government as specified by HOP condition to offset future maintenance costs associated with the enclosed surface storm water facilities.*

A sample agreement can be found here.

Pipe selection and design life is also a critical element for the local government to review to ensure the drainage facilities provided by the developer will not need immediate replacement. Refer to Appendix C for a pipe selection and design life chart.

3.2 Security Options for Local Government

Description: *At the **sole discretion** of the Local Government, Property Owner may be required to provide security for the construction, maintenance, and indemnity obligations concerning the enclosed surface storm water facilities in the form of (a) **Escrow Account** or (b) **Bond** in a form and amount satisfactory to the Local Government. Refer to Appendix B for sample calculations if Escrow, Bond, and Lump Sum amounts.*

3.2.1. Escrow – deposit of funds into an account to be held by the Local Government in the developer's name in an interest bearing segregated account.

a. Example includes a one-time payment (initial sum) to maintain enclosed surface storm water features.
b. Similar to escrow accounts that Local Governments use for impact fees or traffic signal maintenance.

3.2.2 Bond – posting of a construction and maintenance bond and naming the Local Government as oblige.

a. Example includes a one-time payment (bond price) to maintain the enclosed surface storm water features.
b. Similar to municipal bonds where regular coupon payments would be used by Local Government.

3.2.3 Letter of Credit (LOC) – deposit of funds into an account similar to an Escrow. Please see the PennDOT Irrevocable Letter of Credit Form M-950L for an example of a LOC for a PennDOT HOP.

3.2.4 Lump Sum – a one-time payment made to the local government when they don't want the burden of a security payment. The fee should take into account the anticipated cost of the future improvements.

3.2.5 Additional types of security may be accepted by the Local Government.

3.2.6 Additional worksheets could be developed to calculate annual payments or match the Local Government's current acceptable practices for providing security.

APPENDIX A

TABLE 1 – SUMMARY OF RESPONSIBILITY WHERE PROPERTY OWNER IS APPLICANT FOR HOP				
Storm Water Category	*Scenario*	*Local Government Responsibility*	*Department Responsibility*	*Driveway/Local Road Applicant Responsibility*
Category 1	Open and enclosed surface storm water facilities draining or conveying drainage under a proposed driveway or local road.	None	Issue HOP to applicant	Apply for HOP and maintain storm water facility
Category 2	Open and enclosed surface storm water facilities draining more than a proposed driveway or local road, whether connected to a highway drainage facility or not.	Approve	Issue HOP to applicant with local government approval	Apply for HOP and maintain storm water facility
Category 5	Enclosed surface storm water facilities not connected to a highway drainage facility	Option to apply for HOP	Issue HOP to applicant or local government	Apply for HOP if deemed to directly or indirectly serve the public & maintain storm water facility

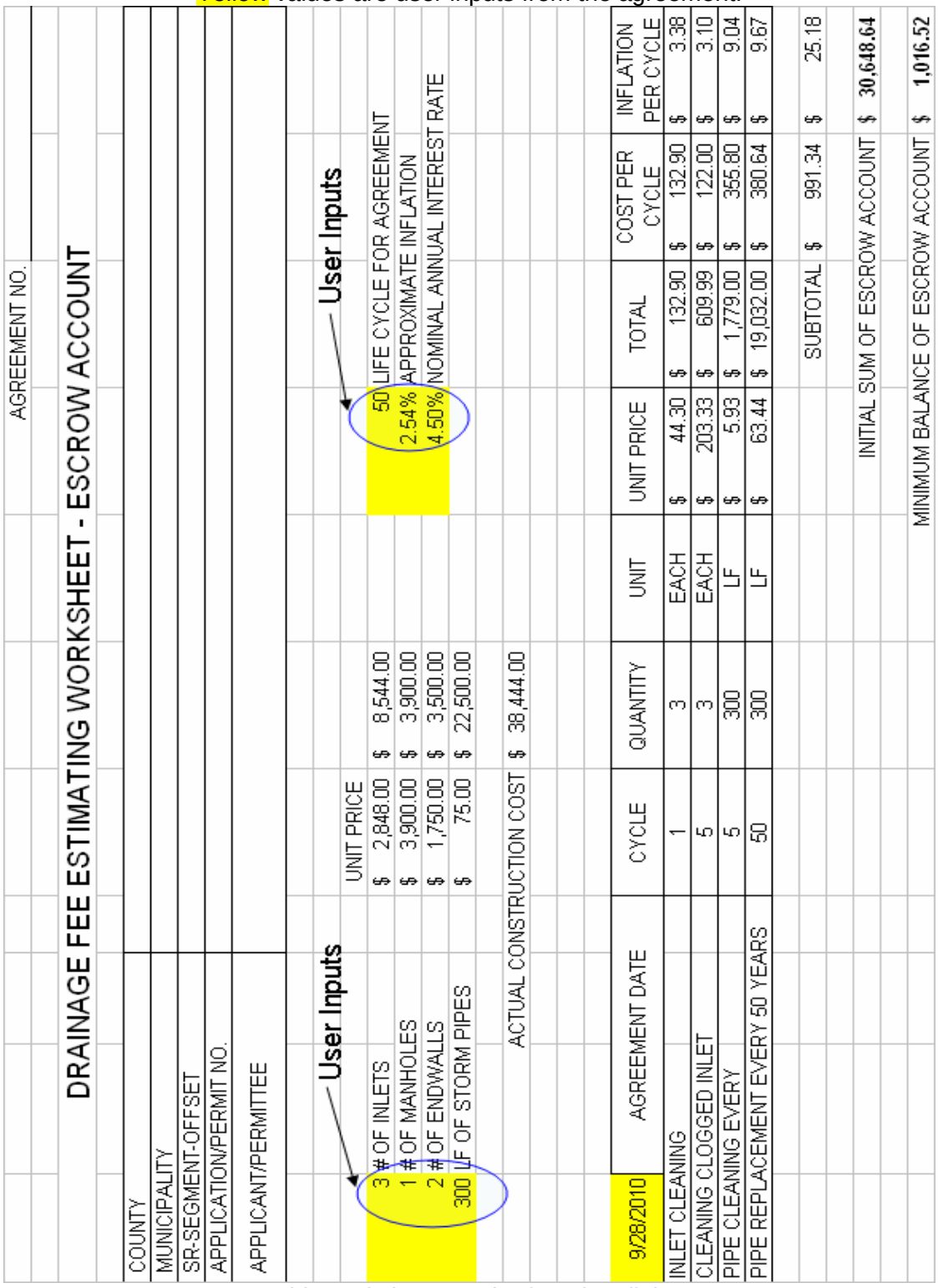
APPENDIX A

TABLE 2 – SUMMARY OF RESPONSIBILITY WHERE LOCAL GOVERNMENT IS APPLICANT FOR HOP				
Storm Water Category	*Scenario*	*Local Government Responsibility*	*Department Responsibility*	*Driveway/Local Road Applicant Responsibility*
Category 3	Enclosed surface storm water draining more than a proposed driveway or local road and physically or hydraulically connected to an existing or new highway drainage facility.	1) Apply for HOP individually, *or* 2) Apply as co-applicant with driveway/local road applicant	1) Issue HOP to local government, *or* 2) Issue HOP to local government & driveway/local road applicant	Financially responsible for maintenance of storm water facility(ies)
Category 4	New or modified enclosed surface storm water facilities draining the highway and/or adjacent properties.	1) Apply for HOP individually, *or* 2) Apply as co-applicant with driveway/local road applicant	1) Issue HOP to local government, *or* 2) Issue HOP to local government & driveway/local road applicant	Financially responsible for maintenance of storm water facility(ies)
Category 5	Enclosed surface storm water facilities not connected to a highway drainage facility	Option to apply for HOP	Issue HOP to applicant or local government	Apply for HOP if deemed to directly or indirectly serve the public & maintain storm water facility

APPENDIX B

Figure 1 - Escrow Example Worksheet

Yellow values are user inputs from the agreement.



DRAINAGE FEE ESTIMATING WORKSHEET - ESCROW ACCOUNT

AGREEMENT NO.

COUNTY	
MUNICIPALITY	
SR-SEGMENT-OFFSET	
APPLICATION/PERMIT NO.	
APPLICANT/PERMITTEE	

User Inputs

		UNIT PRICE	
3	# OF INLETS	$ 2,848.00	$ 8,544.00
1	# OF MANHOLES	$ 3,900.00	$ 3,900.00
2	# OF ENDWALLS	$ 1,750.00	$ 3,500.00
300	LF OF STORM PIPES	$ 75.00	$ 22,500.00
	ACTUAL CONSTRUCTION COST		$ 38,444.00

User Inputs

50	LIFE CYCLE FOR AGREEMENT
2.54%	APPROXIMATE INFLATION
4.50%	NOMINAL ANNUAL INTEREST RATE

9/28/2010	AGREEMENT DATE	CYCLE	QUANTITY	UNIT	UNIT PRICE	TOTAL	COST PER CYCLE	INFLATION PER CYCLE
	INLET CLEANING	1	3	EACH	$ 44.30	$ 132.90	$ 132.90	$ 3.38
	CLEANING CLOGGED INLET	5	3	EACH	$ 203.33	$ 609.99	$ 122.00	$ 3.10
	PIPE CLEANING EVERY	5	300	LF	$ 5.93	$ 1,779.00	$ 355.80	$ 9.04
	PIPE REPLACEMENT EVERY 50 YEARS	50	300	LF	$ 63.44	$ 19,032.00	$ 380.64	$ 9.67
						SUBTOTAL	$ 991.34	$ 25.18
						INITIAL SUM OF ESCROW ACCOUNT		$ 30,648.64
						MINIMUM BALANCE OF ESCROW ACCOUNT		$ 1,016.52

This worksheet can be found at: link

APPENDIX B

Figure 2 - Bond Example Worksheet

Yellow values are user inputs from the agreement.

AGREEMENT NO.

DRAINAGE FEE ESTIMATING WORKSHEET - BOND

COUNTY	
MUNICIPALITY	
SR-SEGMENT-OFFSET	
APPLICATION/PERMIT NO.	
APPLICANT/PERMITTEE	

User Inputs

		UNIT PRICE		
3	# OF INLETS	$ 2,848.00	$ 8,544.00	
1	# OF MANHOLES	$ 3,900.00	$ 3,900.00	
2	# OF ENDWALLS	$ 1,750.00	$ 3,500.00	
300	LF OF STORM PIPES	$ 75.00	$ 22,500.00	
	ACTUAL CONSTRUCTION COST		$ 38,444.00	

User Inputs

50	LIFE CYCLE FOR AGREEMENT
2.54%	APPROXIMATE INFLATION
4.50%	NOMINAL ANNUAL INTEREST RATE

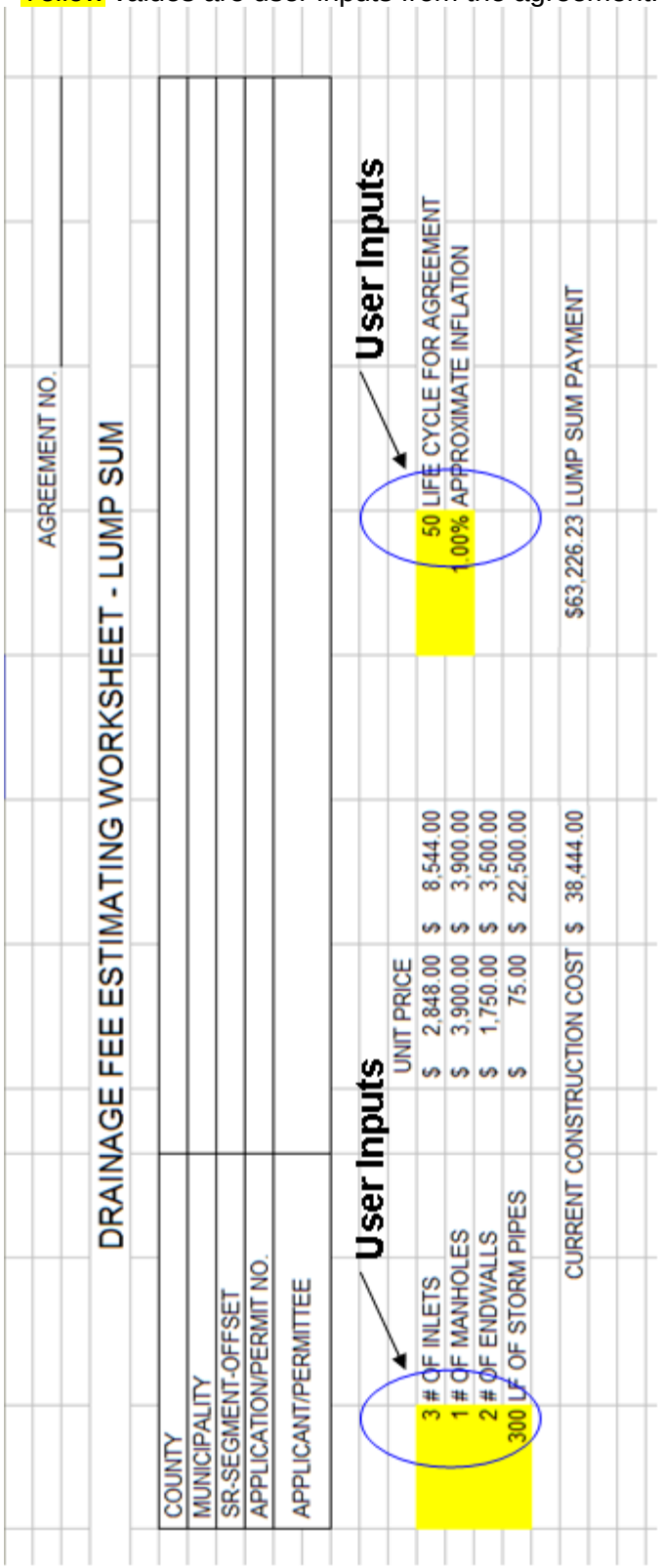
9/28/2010 AGREEMENT DATE	CYCLE	QUANTITY	UNIT	UNIT PRICE	TOTAL	COST PER CYCLE	INFLATION PER CYCLE
INLET CLEANING	1	3	EACH	$ 44.30	$ 132.90	$ 132.90	$ 3.38
CLEANING CLOGGED INLET	5	3	EACH	$ 203.33	$ 609.99	$ 122.00	$ 3.10
PIPE CLEANING EVERY	5	300	LF	$ 5.93	$ 1,779.00	$ 355.80	$ 9.04
PIPE REPLACEMENT EVERY 50 YEARS	50	300	LF	$ 63.44	$ 19,032.00	$ 380.64	$ 9.67
				SUBTOTAL		$ 991.34	$ 25.18
				COUPON PAYMENT (CASHFLOW)			$ **1,016.52**
				BOND PRICE			$ **24,344.56**

This worksheet can be found at: link

APPENDIX B

Figure 3 – Lump Sum Example Worksheet

Yellow values are user inputs from the agreement.



DRAINAGE FEE ESTIMATING WORKSHEET - LUMP SUM

AGREEMENT NO.

COUNTY	
MUNICIPALITY	
SR-SEGMENT-OFFSET	
APPLICATION/PERMIT NO.	
APPLICANT/PERMITTEE	

User Inputs

User Inputs

		UNIT PRICE	
3	# OF INLETS	$ 2,848.00	$ 8,544.00
1	# OF MANHOLES	$ 3,900.00	$ 3,900.00
2	# OF ENDWALLS	$ 1,750.00	$ 3,500.00
300	LF OF STORM PIPES	$ 75.00	$ 22,500.00
	CURRENT CONSTRUCTION COST		$ 38,444.00

50	LIFE CYCLE FOR AGREEMENT
1.00%	APPROXIMATE INFLATION
$63,226.23	LUMP SUM PAYMENT

This worksheet can be found at: link

APPENDIX C

Table 3 – Pipe Selection and Design Life

ALTERNATE PIPE SELECTION CRITERIA BASED UPON LOCATION OF DRAINAGE PIPES

LOCATION OF DRAINAGE PIPES		TYPES OF PIPE		NO. OF ALTERNATES REQUIRED
Cross Drains Under Pavement, Shoulder, or Between Curbs; Parallel Storm Sewers Under Pavement or Between Curbs	Fill*	Interstate/ Arterials	Collectors/ Locals	2
	< 0.6 m (< 2 ft)	100 Years Life (Pipes 1, 2, 5 & 7)	50 Years Life (Pipes 1 & 3 thru 7)	
	0.6 m - 4.6 m (2 ft - 15 ft)	100 Years Life (Pipes 1, 2, 5 & 7)	50 Years Life (Pipes 1 & 3 thru 7 & 8)	
	> 4.6 m (> 15 ft)	100 Years Life (Pipes 1, 2, 5 & 7)	100 Years Life (Pipes 1, 2, 5 & 7)	
Parallel Storm Sewers Outside of Pavement or Curbs	50 Years Life (All pipes in LEGEND)			3
Cross Drains Outside of Pavement, Shoulder or Curbs (Cross Drains in Medians, etc.)	50 Years Life (All pipes in LEGEND except 9)			3
Combination Storm Sewer and Underdrain and Other Special Drainage System	100 Years Life*	Pipe 2, open joint, & perforated pipes 5 & 7		2
	50 Years Life**	Fill * < 0.6 m (2 ft)	Pipe 3, open joint, & perforated pipes 4, 5 & 7	3
		Fill * ≥ 0.6 m (2 ft)	Pipe 3, open joint, & perforated pipes 4, 5, 7 & 8	
Slope Pipes	50 Years Life (Pipes 4 thru 9)			2
Side Drains (Driveways, etc.)	25 Years Life (All pipes in LEGEND)			3

Separate tables are provided for fill height requirements. Utilize those tables for determination of minimum and maximum fill requirements. Specified minimum fill heights are applicable to pipes under pavement or between curbs. Specified maximum fill heights are applicable to all installations.

* Fill is defined as the material from the top of the pipe to the riding surface, including the pavement structure.
* For pipes under pavement or between curbs on Interstate/Arterials.
** For pipes other than under pavement or between curbs on Interstate/Arterials.

LEGEND
(Types of Pipe)

1. DIP = Ductile Iron Pipe.
2. RCP (Type A) = Reinforced Concrete Pipe, heavy duty.
3. RCP (Type B) = Reinforced Concrete Pipe, normal duty (1200 mm (48 in) max).
4. CGSP = Corrugated Galvanized Steel Pipe.
5. CASP = Corrugated Aluminized Steel Pipe.
6. CCGSP = Coated (Polymer) Corrugated Galvanized Steel Pipe.
7. CAAP = Corrugated Aluminum Alloy Pipe.
8. TP (Group I, II, III, IV or VI) = Thermoplastic Pipe, Group I, II, III, IV or VI (1500 mm (60 in) max). Thermoplastic Pipe Groups are defined in Publication 408 Section 601.
9. TP (Group V - Corr PE) = Thermoplastic Pipe, Group V - Corrugated Polyethylene (900 mm (36 in) max). Thermoplastic Pipe Groups are defined in Publication 408 Section 601.

NOTES:

1. Select pipes with specified years life based on the type of drainage installation, class of highway and fill height (cover). The years life indicated (100, 50 and 25) are approximate expected service lives.

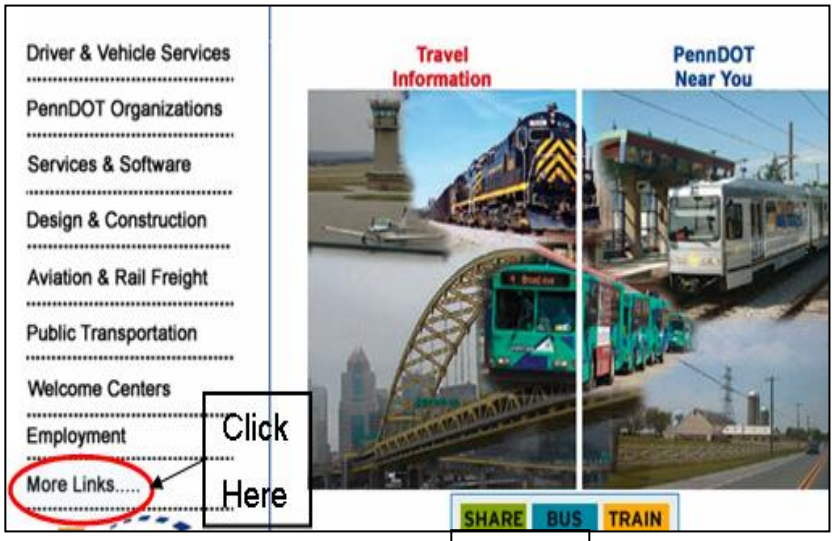
2. Pipe alternates may be eliminated for the following reasons: (1) unstable support, (2) high impact and concentrated loading, (3) high embankments, (4) limited clearance, (5) steep gradients, (6) high acidity to alkalinity of soils and water or other corrosive elements, (7) high erosive forces or (8) for other pertinent reasons.

APPENDIX D

LOCATING SAMPLE AGREEMENT ON THE INTERNET

STEP 1 – Navigate to PennDOT's home page.

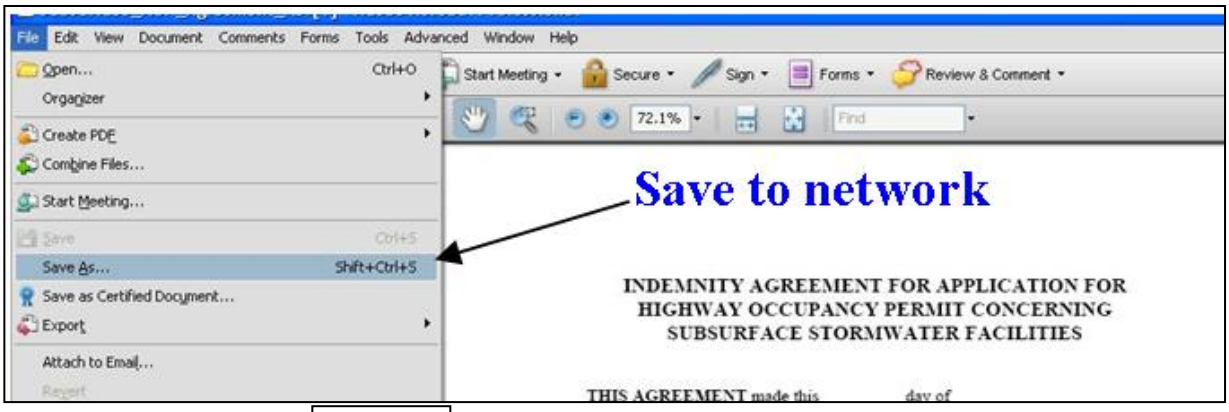
STEP 2 – Select **More Links** along left side.
STEP 3 – Scroll down to middle of page.
STEP 4 – Select Highway Occupancy Permits (HOP)
STEP 5 – Scroll down to bottom of page.
STEP 6 – Select Model Municipal/Land Owner Subsurface Storm Water Facilities Agreement.
STEP 7 – Save to local network.



Step 2

Step 4

Step 6



Step 7