

Developing a Drainage Investigation Management Process to Repair SHA's Aging Drainage Infrastructure



State Highway Administration
Office of Highway Development
Highway Hydraulics Division



Presenter:
Jonathan Brown II, P.E.
Highway Hydraulics Division

Overview

I. Aging SHA Drainage Infrastructure

- a. SHA's Drainage Network
- b. Age of Drainage Infrastructure
- c. Number of Drainage Failures and the Cost

II. SHA Drainage Management (DM) Process

- a. Drainage Investigations
- b. Use of Technology
- c. Two Teams-Remediation & Proactive Approach

III. Transitioning from Reactive to Proactive

- a. District 1 Contract (Pilot)
- b. Expand Implementation
- c. Outfall Remediation by District/County

Aging SHA Infrastructure

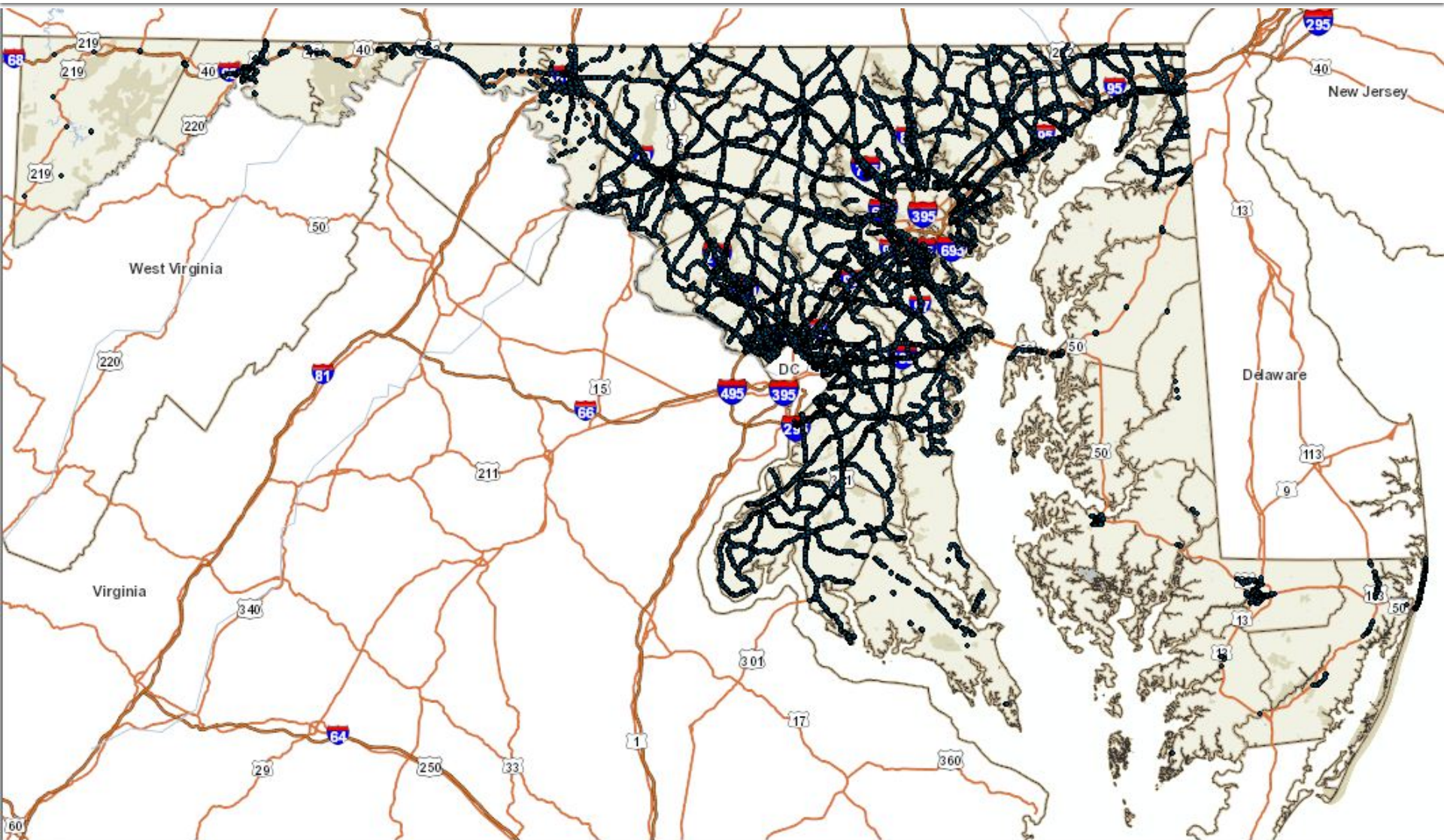
Time and age has caused our drainage infrastructure to reach its limit



Geography & Climate of Maryland



SHA's Drainage Network



How much do we have?

As of 2014, SHA's road network includes approximately 25,000 acres of impervious surfaces

- Our drainage and stormwater assets consist of...
 - 3,300 Permanent Stormwater Management Facilities
 - Detention ponds, wet ponds, infiltration basins
 - 180,000 Hydraulic Structures
 - Inlets, manholes, endwalls
 - 100,000 Conveyances
 - Pipes, culverts, ditches
 - Over 7.5 Million linear feet of pipe

Aging SHA Stormwater Infrastructure – MD 210P Eroded Outfall Threatening Guard Rail, Utilities and Roadway.



Hanging Guardrail Post



24" CMP

Aging SHA Stormwater Infrastructure – Washington Beltway (I-495) CMP failure-Undermined Shoulder of Beltway



Our Aging Infrastructure

- Poor Joints in concrete pipes
- Widespread use of CMP's in corrosive soils or abrasive environment
- Drainage on interstates and major road expansions built in the 1950's and 1960's are now reaching past their life cycles
- Drainage Infrastructure Design Life is generally 50 to 100 Years

SHA Drainage Management (DM) Investigation Process

How the Highway Hydraulics Division approaches and investigates these failures

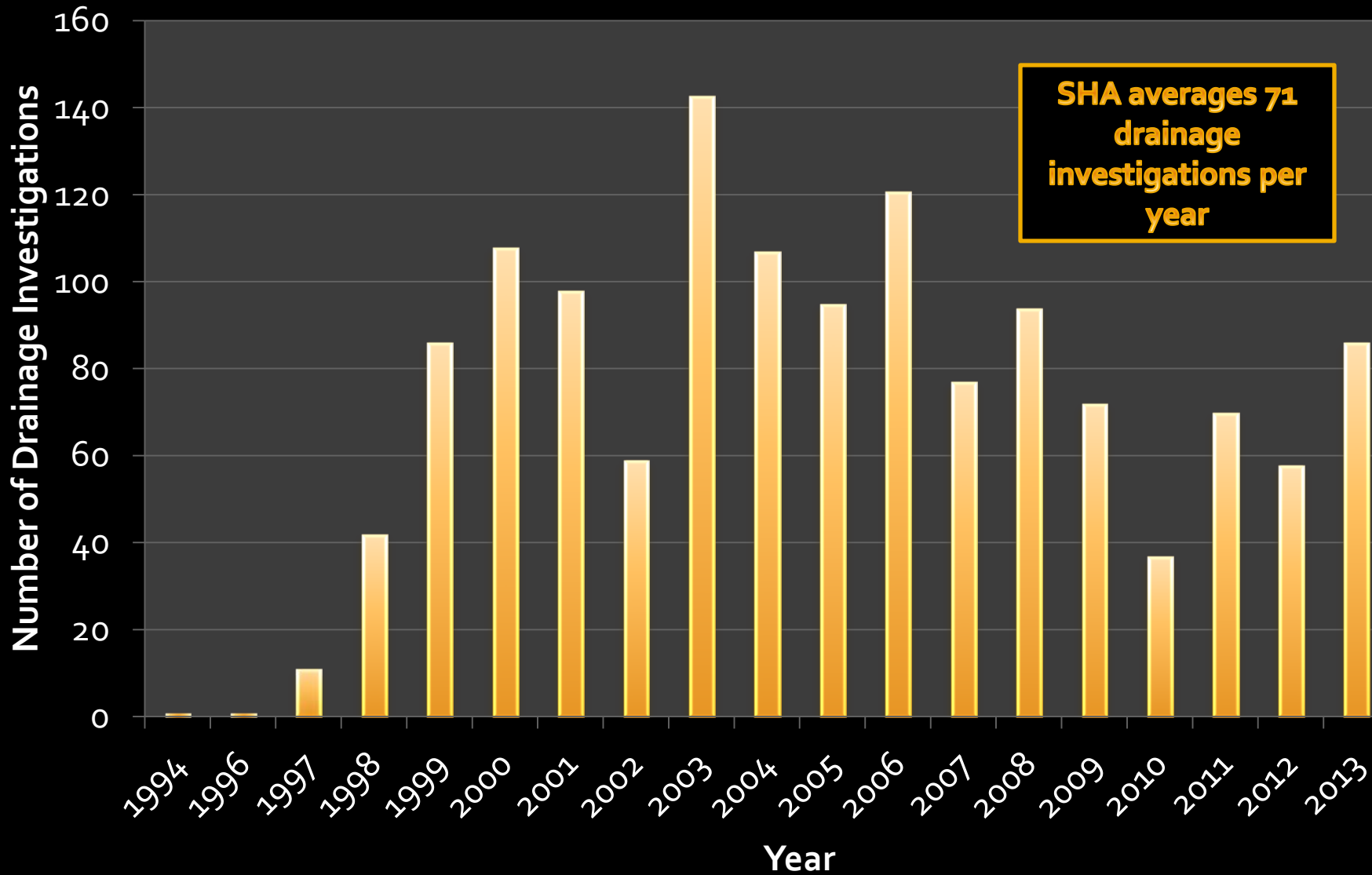


SHA Drainage Investigation Management Process

- What are Drainage Investigations?
 - Determine the cause of flooding
 - Determine the cause of erosion
- Where do Drainage Complaints come from?
 - Public
 - District Management
 - Other SHA Personnel
 - Environmental Agencies
 - Watershed Group

Number of Drainage Investigations Per Year

1994-2013



Drainage Investigation Costs

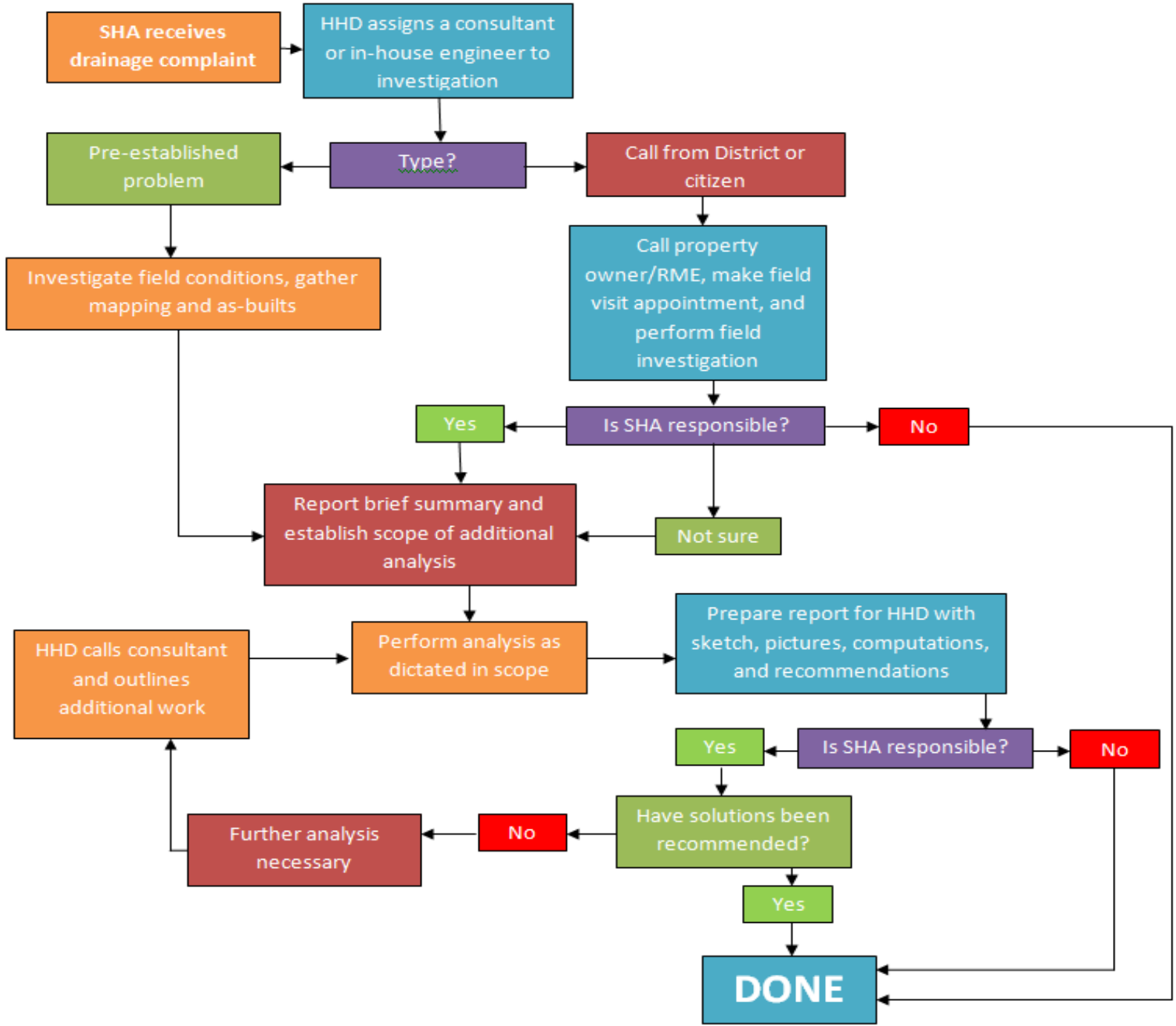
- SHA spends an Ave of \$1 Million Per Year
- Currently spending about \$6 M to \$8 M in Drainage Remediation Per Year

SHA's Drainage Investigation Request Form


- Standardized way to Log Drainage Complaints
- Is available on SHA's Internal website
- Information is transferred to SHA's Database.

SHA		Drainage Investigation Request				hhd Highway Hydraulics Division	
Date:						Submit via email to HHD	
Location Information*							
District	Select...	County		Select...			
HLR Location	Route	Mile Point		HLR Year			
Vicinity Location	ADC Map #	Column		Row			
Street Address				City			
Is there an immediate Safety hazard?				<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
<small>* at least one form of the location is required, preferably more.</small>							
Description of Issue							
Any related projects or permits?							
Related FEMIS #s							
Investigation Requested by (SHA Contact)							
Name							
Title							
Phone							
Email							
Citizen, or Complaint contact (If applicable)							
Name							
Address							
Phone							
Email							
Notes							
Assigned to:							
HYINFO Tracking #							
Other Comments or Notes*							
<small>* include any additional information about the site that you are aware, such as as-built plan information, plots, or any known history on this site or vicinity.</small>							
Attach data files such as photos, maps, as-builts, etc							

Our Current DM Process



About HyInfo



HyInfo

HIGHWAY HYDRAULIC PROJECT MANAGEMENT INFORMATION SYSTEM

Version 2.1 (build 12/27/2007)

HyInfo Software maintains the projects like Special Projects, Highway Hydraulic Projects, Drainage Maintenance, Special Structure, Drainage Structure etc. the Reviews like Access Permit, Utility Permit, Excess Land, Shop Drawing Review, the Inspections like ESC Inspection, Pipe/Inlet Inspection, BMP Inspection etc and also maintaining the standards like Drainage Structure and Project Budget etc.

2002 RAM Consulting Corporation. All rights reserved.

Technology to manage Drainage Investigations

http://shantnet/hhd/divisions/hhd/orfau.aspx


Home - Highway Hydraulic...

File Edit View Favorites Tools Help

NTP Ltr dm hhd Suggested Sites Web Slice Gallery

Site Actions Browse Page

Jonathan Brown



SharePoint

I Like It Tags & Notes

OHD Home SHA Home OHD Divisions Design Resources Support All Sites

Human Resources Training Contact Us

OHD Home > OHD Divisions > Highway Hydraulics Division

Highway Hydraulics Division

Libraries

HHD Calendar/ Reserve Conference Area

About HHD

Asset Management

Construction Modification Reviews

Drainage Investigations and Assessments

HHD Design Resources

- Details
- Drainage
- ESC
- Specs
- Std.s & Details
- SWM

Libraries

Teams

Recycle Bin

All Site Content

Announcements

There are currently no active announcements. To add a new announcement, click "Add new announcement".

(More Announcements...)

Add new announcement



HHD Quick Links

URL

Ad Schedule

Basic Hydraulic Principles

Category Code Search (TEDO)

Construction Assignments

Consultant Contacts

Consultant Task Proposal Process

Critical Areas

District Reference Chart

Drainage Common Law Rights

EGIS

Field Safety

HHD Legacy Site

Maintenance Request

MOE SWM Program

Welcome to Highway Hydraulics!

The Highway Hydraulics Division (HHD) works on planning, design, construction, and maintenance aspects of SHA operations and is responsible for providing engineering -- as well as project management services -- for drainage, stormwater management, erosion and sediment control, stream stabilization, and small stream crossings. We are responsible for obtaining State approvals related to stormwater management, sediment control, and National Pollutant Discharge Elimination Systems (NPDES) construction permits for all SHA projects and operations. We also support the Wetland and Waterways Permit process by preparing Joint Permit Applications (JPAs) on behalf of Highway Design, Community Design, District Special Projects, and Maintenance. We also provide engineering services for meeting waterway and floodplain regulations. HHD investigates drainage concerns associated with highways, provides resolution if needed and manages stormwater/drainage funding (Fund 74) as a drainage asset manager. HHD manages the Stormwater Facilities

Warning

http://shagbegis1/egis/


File Edit View Favorites Tools Help

E-Mail: NTP Ltr dm hhd Suggested Sites Web Slice Gallery

eGIS

SHA Enterprise GIS Portal (eGIS Version 1.7)

In Out Pan Full Back Forward Basemap Content Feedback Print



West Virginia

Delaware

Virginia

Hyinfo

- Custom database application
- Outside divisions and districts have no access

DM Project List

New
 Edit/View
 Delete
 Print
 Archive
 Open ProjectWise Folder
 Export
 Search
 Clear

Search Fields

County:
 Route No.:
 FMIS No.:
 Out. Days:
 Archived:

File No:
 Status:
 In-house:
 Consultant:

District:
 Dt. Recvd.: 07/18/2014
 To: 07/18/2014
 Received and not Assigned?
 Assigned
 Assigned, 90 days past and not complete?

Project No	Route	FMIS	Project Name	County	Dt. Received	Status	Consultants	Pri. Ranking
00-DM-AA-002	MD - 3 B...	AA-410-A21	1004 Crain Highway	Anne Arundel	09/14/2000	P-In Construct	NMP Engi...	
01-DM-CE-001	MD - 7C		Along Peddler's Run Creek	Cecil	01/16/2001	On Hold	JMT	
01-DM-MD-002	MD - 115		Windsor Manor Lane	Montgomery	12/26/1996	Complete	Inhouse	
01-DM-PG-003	US - 50		EB, 1250' E of MD201/295 Int...	Prince George	03/02/2001	On Hold	Whitman, ...	
01-DM-PG-006	MD - 4		near AA/PG County Line	Prince George	04/19/2001	Complete	RJM Engin...	
01-DM-WA-001	US - 11		Maugans Ave to Showalter Rd	Washington	06/18/2001	On Hold	Inhouse	
02-DM-AA-002	MD - 424		2165 Davidsonville Road -Be...	Anne Arundel	05/08/2002	Complete	KCI Techn...	
03-DM-AA-018	MD - 648	AA-356-A21	North of MD 170 - (AD)	Anne Arundel	11/21/2003	P-Complete	STV Incor...	
03-DM-BA-004	MD - 439		19946 Old York Road (O.E. D4)	Baltimore	04/17/2003	P-Complete	DMJM+HA...	
03-DM-BA-015	MD - 439		19946 Old York Road (O.E. D4)	Baltimore	04/17/2003	P-Complete	DMJM+HA...	

718

Date	Comment
05/15/2009	CONSTRUCTION: NTP to contractor (Ardent sp?) is out, NMP reviewing Shop drawings. Revisions to waterline...
03/23/2009	CONSTRUCTION: bids opened late Dec., Erica addressing bid justification. DESIGN: Complete. PERMITS: S...
01/27/2009	CONSTRUCTION: bids opened late Dec., possible bid justification needed. DESIGN: Complete. PERMITS: S...
11/03/2008	DESIGN: Complete, pending permit revisions. PERMITS: SWM - Approved JPA - Approved ...
09/23/2008	DESIGN: Complete, pending permit revisions. PERMITS: SWM - Approved JPA - Approved ...
08/21/2008	Status update from Ron: JPA all comments addressed. They require CAC approval SWM E&S approval rec'd a...
05/27/2008	PSE submitted to SHA 5/13 Ad 7/22 Waiting on comments for JPA. Plats were issued, but are currently being ...
02/27/2008	AD date now anticipated as June 19, 2008, upon successful resolution of utility conflicts. JPA has been submit...
01/29/2008	AD date now anticipated as June 19, 2008, upon successful resolution of utility conflicts. JPA has been submit...

SharePoint

- Accessible throughout SHA
- Submit new complaints
- Allows status tracking

Drainage Investigation and Assessment

Home

Announcements

Finding And Entering Coordinates for DM Projects
by Stephen Buckley

A procedure for Finding And Entering Coordinates for DM Projects has been developed. Please ensure that coordinates are entered for all DM's. [DMCoordinates](#)

Updated request form
by Stephen Buckley

The Drainage Investigation Request form has been updated. Please ensure one gets filled out and attach it to the Service Request.

Rating Form
by Stephen Buckley

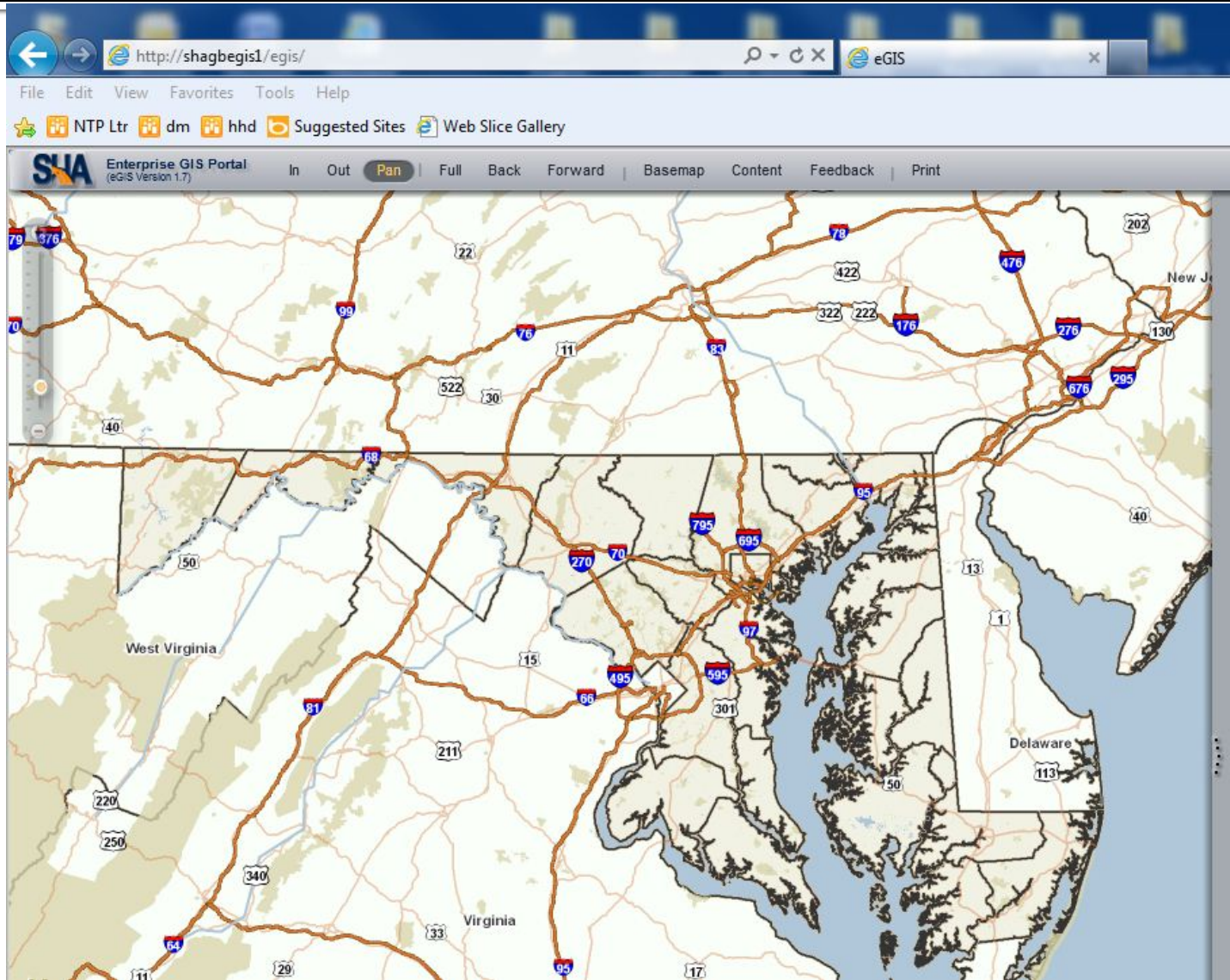
Please ensure that a DM Rating Form is filled out for each investigation <http://shaintranet/ohd/divisions/hhd/DIA/DM%20References/XX-DM-XXXX%20Rating%20Form.xls>

Active Drainage Investigations

Tracking No.	Route	Location	Details	District	Assigned	Priority	Entered	Site Visited	Status	Stage	Resolution Date	Commer
Count = 85												
13-DM-BA-006	I-83	I-83 North of Western Run	Culvert outfalls undermined and some collapsed, Major erosion slope repair.	4	Jonathan Brown	(2) Normal	4/25/2014	3/24/2014	Initiated			View Entries...
14-DM-PG-002	US 50	6445 Forest Avenue, Cheverly	Homeowner alleges erosion from culvert outfall under US 50.	3	Jeremy Ash	(2) Normal	4/14/2014		Engaged			View Entries...
14-DM-AL-002	MD 36	MD 36 Slope Erosion in Barton at Old Reynolds Rd.	MD 36 un-numbered drainage structure that drains run off from the east side of MD 36, across Md 36 and into Georges Creek. The west slope of MD 36 at that structure is sliding and causing major erosion and has caused the 6 foot long section of the 36 inch pipe to fall off into Georges Creek. The slope also is the supporting slope of MD 36 and is starting to crack and threatens the integrity of the S/B shoulder of roadway. The slope is also in an area that Georges Creek bends therefore washing away the and eroding the area.	6	Jeremy Ash	(2) Normal	4/10/2014	4/16/2014	Resolved			View Entries...

eGIS

- Allows the use of spatial data
- Group projects together

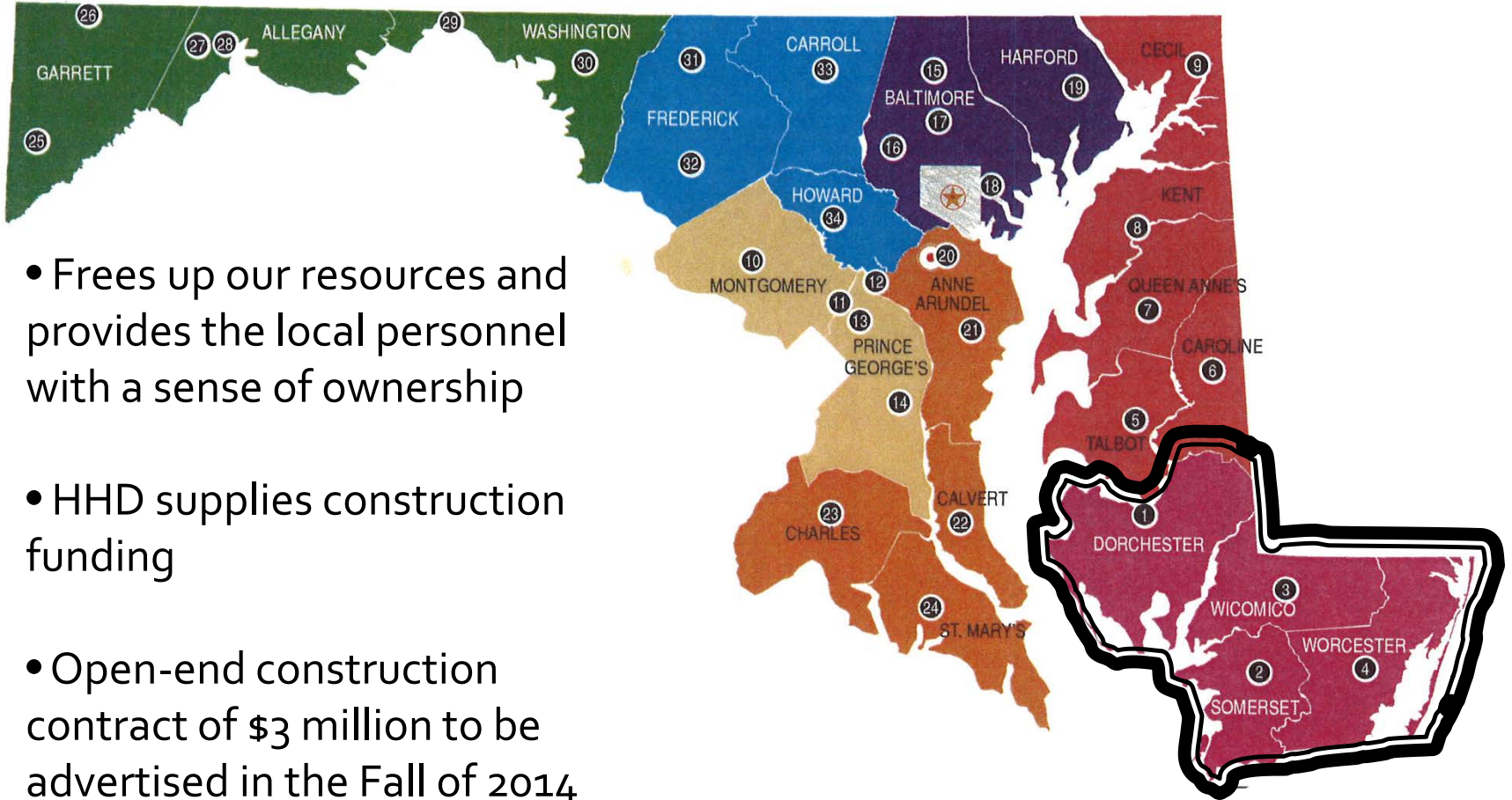


Transitioning from Reactive to Proactive

How we are working to improve our approach and investigation process



District 1 Contract



- Frees up our resources and provides the local personnel with a sense of ownership
- HHD supplies construction funding
- Open-end construction contract of \$3 million to be advertised in the Fall of 2014

Transition from Reactive to Proactive

- Cost savings
- Ability to plan better for spending
- Start of transition from reacting to drainage complaints to asset management
- Decrease response time to avoid putting off minor problems until they become urgent

Expand Implementation

- D3, D6, and D7 have expressed interest in open-ended construction contracts
- Requires buy-in from district personnel
- As the rest of the districts see the benefits, we expect all will participate in the program

Summary

- I. Aging SHA Drainage Infrastructure
- II. SHA Drainage Management Investigation Process
- III. Transitioning from a Reactive to Proactive

Conclusion

What we hope you have taken away

*We must continue to successfully
manage the remediation of our aging
drainage infrastructure*