PennState

Training and Education Series

OPP Stormwater Management

Stormwater Management Information Regarding

Tracking Illicit Discharges

PennState

What is an illicit discharge?

The EPA defines an illicit discharge as any discharge to the municipal separate storm sewer system (MS4) that is not composed entirely of stormwater, except for discharges allowed under a NPDES permit or waters used for firefighting operations.

Since the University holds a MS4 permit, it's required to have an illicit discharge detection and elimination program.

This presentation describes what you should do if you suspect an illicit discharge.

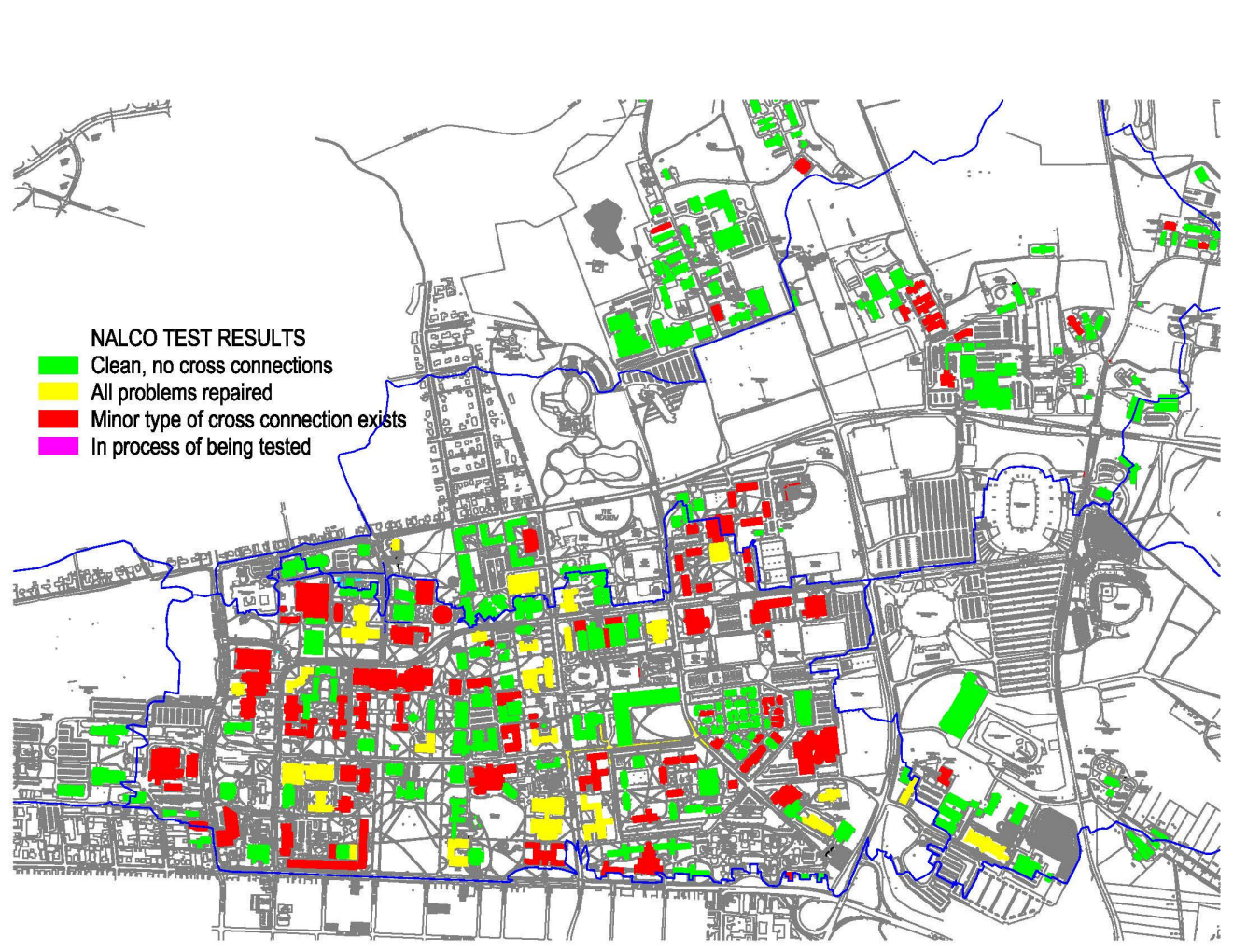
PennState

What are some examples of non-stormwater discharges that are permitted?

1. Discharges or flows from firefighting activities.
2. Discharges from potable water sources including water line flushing and fire hydrant flushing, if such discharges do not contain detectable concentrations of Total Residual Chlorine (TRC).
3. Non-contaminated irrigation water, water from lawn maintenance, landscape drainage and flows from riparian habitats and wetlands.
4. Diverted stream flows and springs.
5. Non-contaminated pumped ground water and water from foundation and footing drains and crawl space pumps.
6. Non-contaminated HVAC condensation and water from geothermal systems.
7. Residential (i.e., not commercial) vehicle wash water where cleaning agents are not utilized.
8. Non-contaminated hydrostatic test water discharges, if such discharges do not contain detectable concentrations of TRC.

PennState

The University has tested most buildings and has repaired many cross connections. Some minor problems have had signs posted or drains plugged until projects can be started.



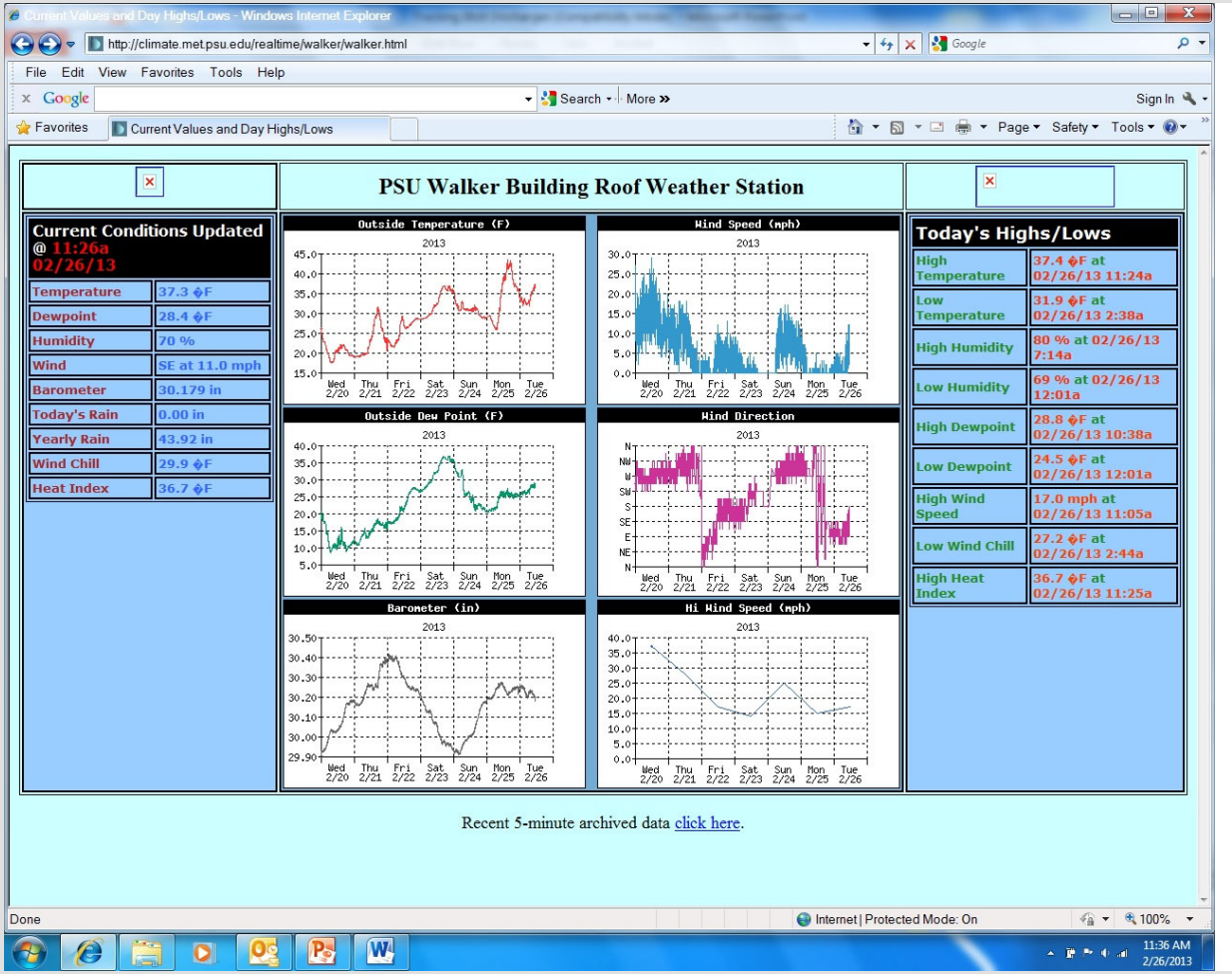
The University's stormwater system is complex with over 73 miles of storm lines and numerous stormwater facilities; therefore, not all dry weather flows are illicit such as the permitted flow shown below.

Thompson Spring non-contact reactor cooling water return flow

PennState

The Main Campus watershed will have permitted flow year around; however, the other University watersheds should not normally have dry weather flow occurring.

Dry weather flow inspections should be conducted when there has not been any measurable rainfall (<0.01”) in the last 72 hours. The University uses the Walker Building Weather Station for rainfall.



http://www.meteo.psu.edu/~wjs1/wxstn/

PennState

The Office of Physical Plant has purchased stormwater test kits for field analyses. These kits should be taken with each time.

Stormwater kits include tests for:

- Chlorine, total
- Copper, total
- Detergents
- pH
- Phenols
- Temperature

You should also remember to take personal protective equipment including rubber gloves and safety glasses. Hard hats or steel toed boots may be required depending on the location.

Never wade into fast moving water without the proper training and support.

PennState

What do you do if you discover an apparent illicit discharge at an outfall that should be dry?

PennState

The first thing you should do is estimate the flow. At University Park, most illicit discharges will be very small with high flows likely being due to a fire hydrant discharge or a utility line break.

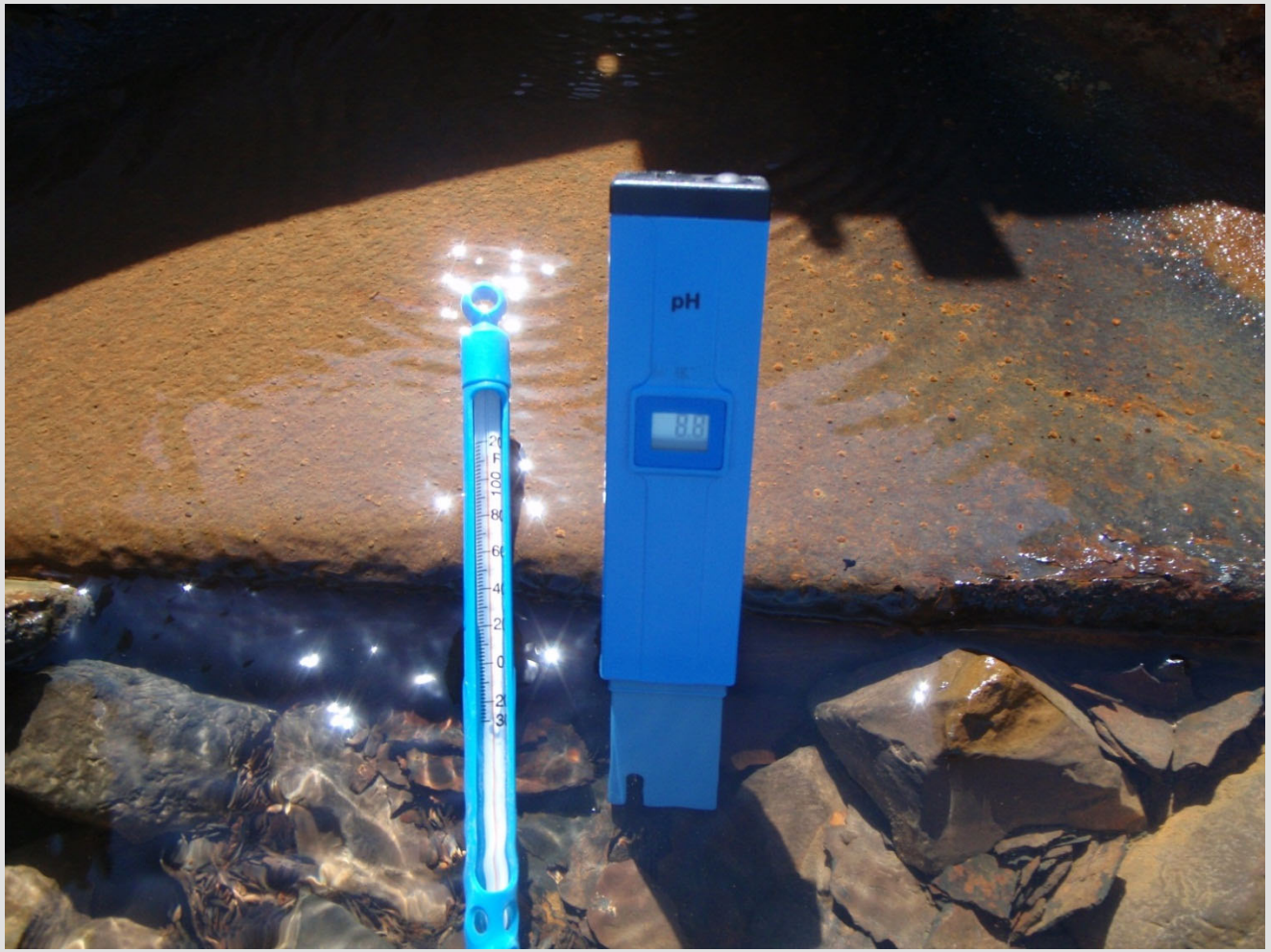
Estimating the flow takes practice. Do some tests with a hose and watch it flow across the ground. A typical garden hose discharges about 4 to 5 gallons/minute. There are 7.48 gal/min in one cubic foot/second (cfs).

Flow in a channel can be estimated by taking the (average depth) x (average width) x (the apparent velocity).

Taking photographs does not generally help much because velocity can't be determined.

PennState

Then check the water's temperature, pH, and total chlorine

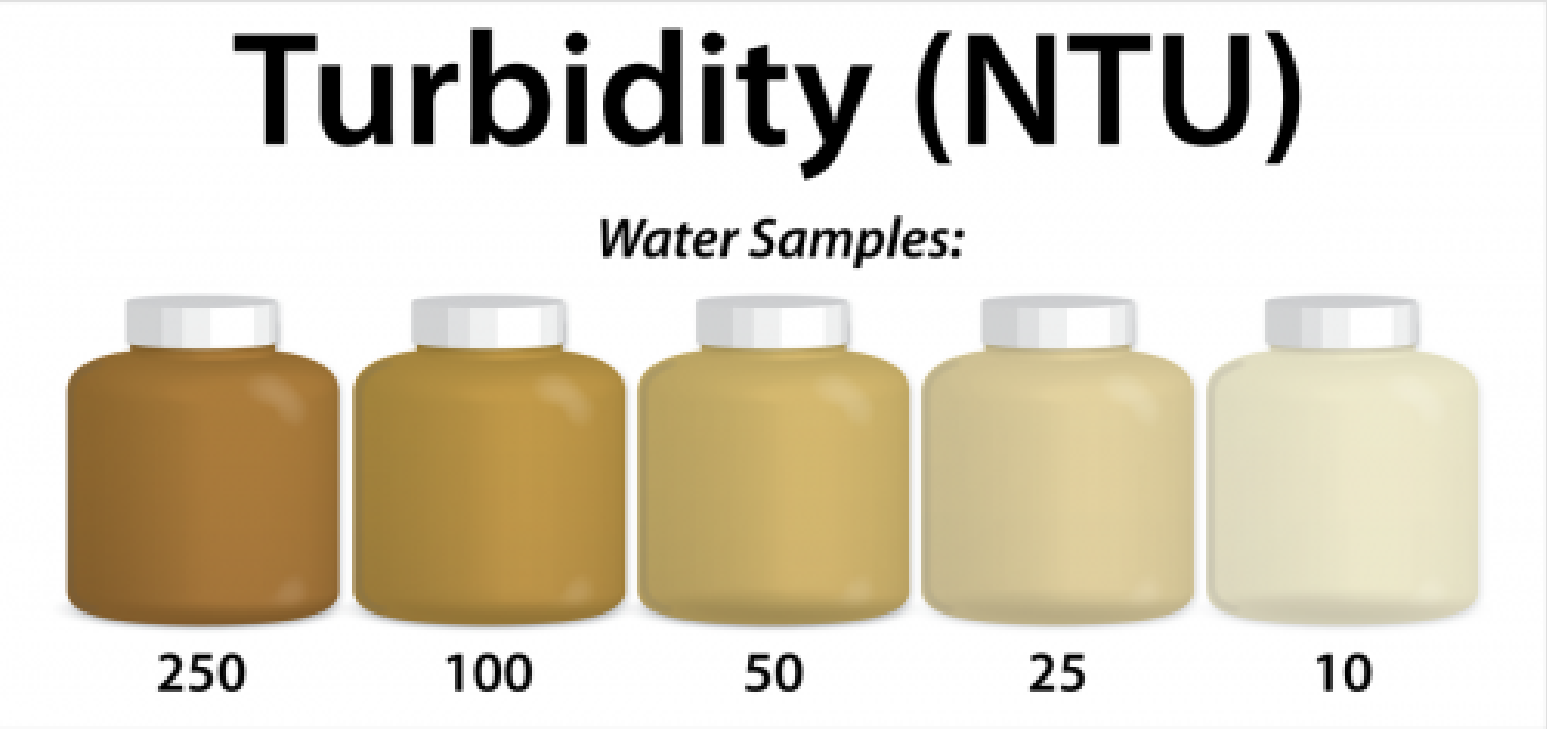


PennState

Observe the color. Sometimes it may be obvious that the color is off; however, standard practice is to place the effluent into a clear glass beaker. Also, what does it smell like?

PennState

Estimate the turbidity. Are there floatables or other indicators?

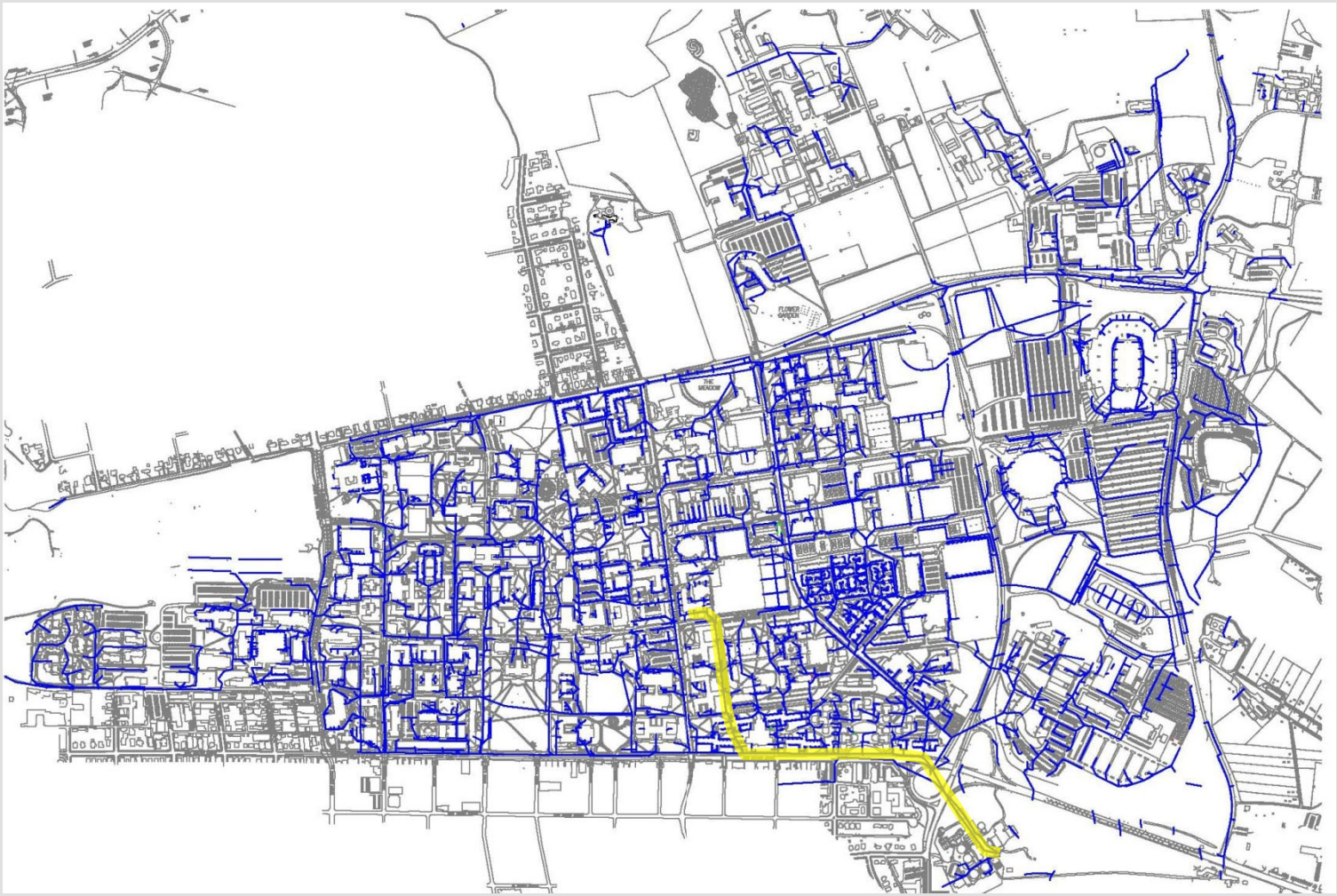


Courtesy Learn NC

If the discharge is an unnatural color, has lots of soap suds, or a sewage smell, immediately call a supervisor or the Physical Plant/ Maintenance and Operations group to report a possible spill.

PennState

Using the campus storm drain maps, track the potential illicit discharge from the outfall upstream.



PennState

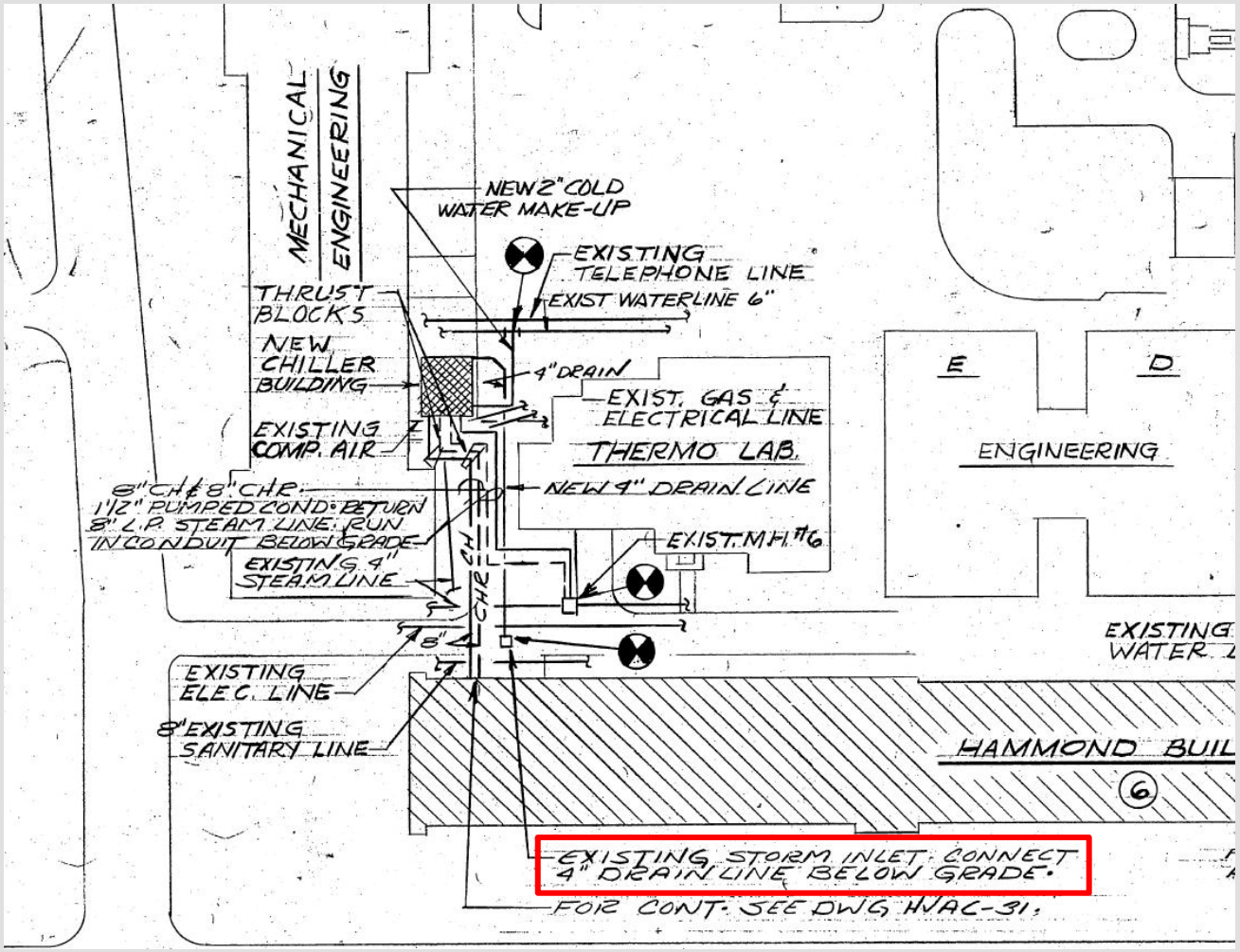
Look into each upslope inlet on the storm line the discharge is coming from to track the flow.

PennState

At manholes, remove the lids to track the flow only if you're properly trained to do so. If not, call for assistance from utility services.

If the flow stops between inlets or manholes, it is likely coming from a blind connection. This can be determined by having Utility Services camera the pipe or by reviewing the building plans.

Old plans frequently show what are now considered sanitary discharges, such as floor drains, going to the storm system, which was often standard practice at the time of construction.



If the building has not been tested already, die trace testing may be required to verify the source of the illicit discharge, especially if it only occurs rarely.

PennState

You may also discover illicit discharges occurring at an inlet such as the milk in the below photograph that would have been diluted prior to reaching the outfall.

PennState

Engineering Services maintains the cross connection studies already conducted. These reports should also be reviewed.

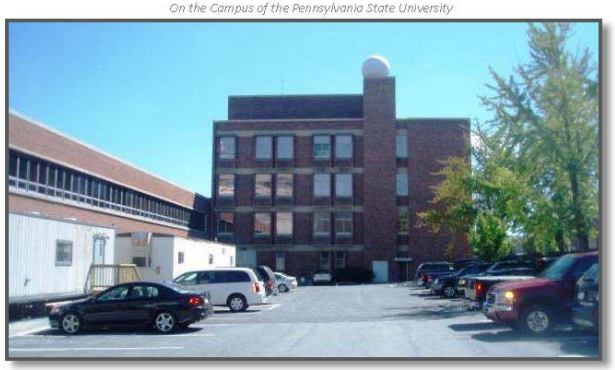
clarity water technologies llc

November 14, 2010

This Service Report outlines our Results from mapping the flow path of all storm drains and identifying any sanitary drains cross-connected to the storm system.

Applied Research Laboratory

On the Campus of the Pennsylvania State University



Location	*Penn State University, University Park, PA 16802*
Building Name	*Applied Research Laboratory*
Building Number	*0996-010*
Work Start Date	*September 21, 2010*
Major Scope of Work	*Test flow path from storm and sanitary drains*
Work Dates	*September 20, 2010 –October 31, 2010*

Page 1 of 27

CUSTOMER: The Pennsylvania State University
ADDRESS: Office of Physical Plant, University Park, PA 16802.
NALCO REPS: Mike Weiland 814-239-8070 (michael.weiland@consultant.com)

Feb. 2009

CROSS-CONNECTION IDENTIFICATION EXECUTIVE SUMMARY REPORT

NALCO

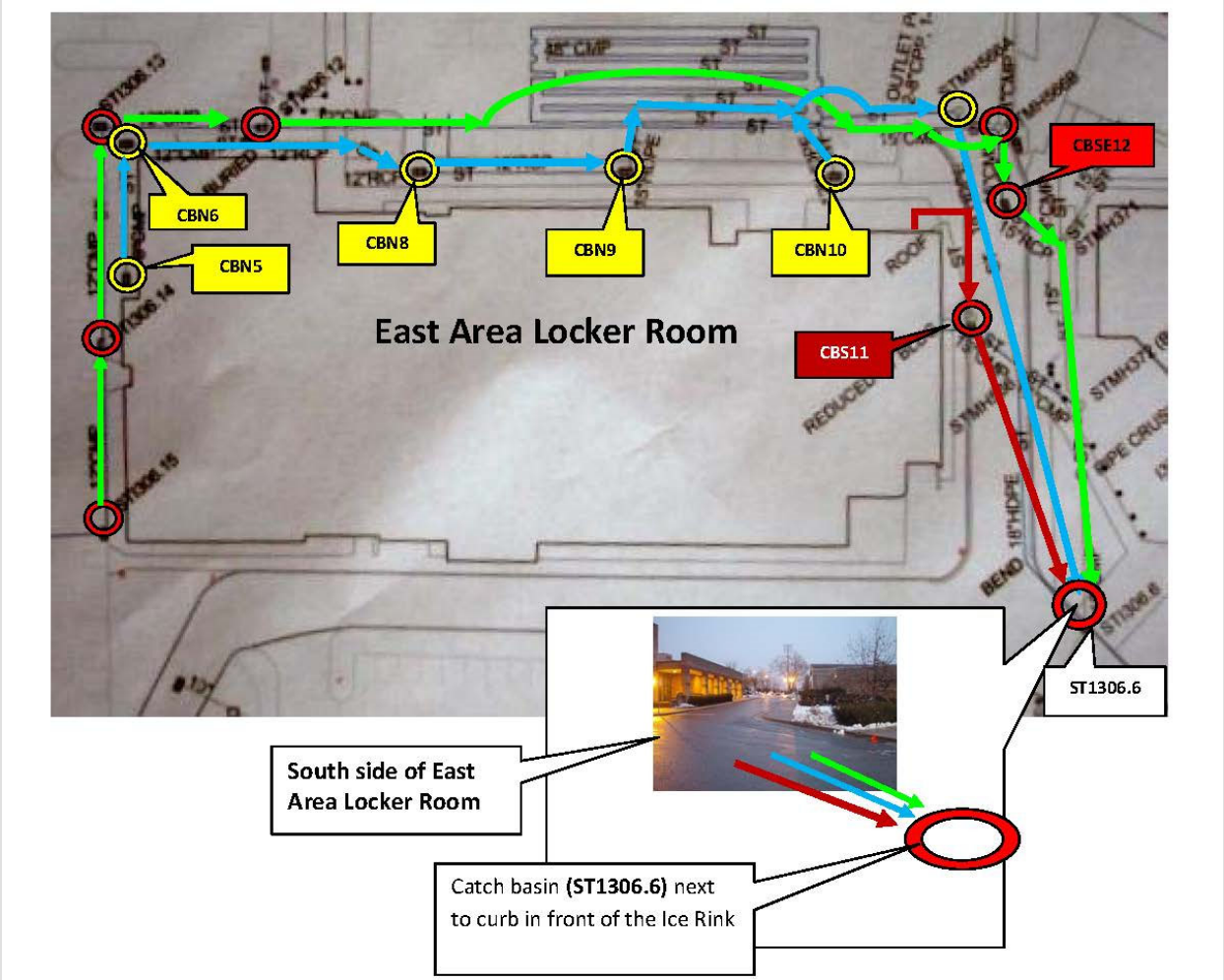
Research West/ARL Building, State College, PA

- PSU Building #: **0271-000**
- Location of Building Tested: **Penn State University Campus, University Park, PA 16802**
- Dates Tested: **December '08 – January '09**

Nalco Chemical 2929 Gettysburg Road Suite 3 Camp Hill, PA 17011 1

PennState

The cross-connection studies in conjunction with the campus maps will help you determine exactly where the discharge is coming from.



If it's found that an illicit discharge was occurring, report it to your supervisor and follow up to see if its repaired. Temporary measures such as installing drain plugs are acceptable for short periods of time.

PennState

The MS4 permit includes a two-page outfall reconnaissance inventory/sample collection field sheet. All illicit discharge investigations need to be included in the MS4 Annual Report.

3800-FM-BCW0521 12/2015
MS4 Outfall Field Screening Report

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MS4 OUTFALL FIELD SCREENING REPORT

BACKGROUND INFORMATION	
Permittee Name: **The Pennsylvania State University**	NPDES Permit No.: **PAI134807**
Date of Inspection:	Outfall ID No.:
Land Uses in Outfall Drainage Area (Select All):	Latitude: ____° ____' ____"
☐ Industrial ☐ Urban Residential	Longitude: ____° ____' ____"
☐ Commercial ☐ Suburban Residential	Dry Weather Inspection? ☐ Yes ☐ No
☐ Open Space ☐ Other:	Date of Previous Precipitation:
	Amount of Previous Precipitation: in
Inspector Name(s):	Were Photographs Taken? ☐ Yes ☐ No
	Are Photographs Attached? ☐ Yes ☐ No

OUTFALL DESCRIPTION

TYPE	MATERIAL	SHAPE	DIMENSIONS	SUBMERGED
☐ Closed Pipe	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other	☐ Circular ☐ Single ☐ Elliptical ☐ Double ☐ Box ☐ Triple ☐ Other ☐ Other	Diameter: ____ in	☐ In Water ☐ With Sediment
☐ Open Channel	☐ Concrete ☐ Earthen ☐ Rip-Rap ☐ Other	☐ Trapezoid ☐ Parabolic ☐ Other	Depth: ____ in Top Width: ____ in Bottom Width: ____	

Dry Weather Flow Present at Outfall During Inspection? ☐ Yes ☐ No *(If No, skip to Certification Section)*

Description of Flow Rate: ☐ Trickle ☐ Moderate ☐ Significant ☐ N/A

DRY WEATHER FLOW EVALUATION

Does the dry weather flow contain color? ☐ Yes ☐ No If Yes, provide a description below.

Does the dry weather flow contain an odor? ☐ Yes ☐ No If Yes, provide a description below.

Is there an observed change in the receiving waters as a result of the discharge? ☐ Yes ☐ No
If Yes, provide a description below.

Does the dry weather flow contain floating solids, scum, sheen or substances that result in deposits? ☐ Yes ☐ No
If Yes, provide a description below.

- 1 -

3800-FM-BCW0521 12/2015
MS4 Outfall Field Screening Report

Were sample(s) collected of the dry weather flow? ☐ Yes ☐ No (If Yes, No. Samples: ____)

FIELD / LABORATORY ANALYSIS

PARAMETER	RESULTS	UNITS	PARAMETER	RESULTS	UNITS
Flow Rate		GPM	Fecal Coliform		No./100 mL
pH		S.U.	COD		mg/L
Total Residual Chlorine (TRC)		mg/L	BOD5		mg/L
Conductivity		µmhos/cm	TSS		mg/L
Ammonia-Nitrogen		mg/L	TDS		mg/L
Other: ____			Oil and Grease		mg/L
Other: ____			Other: ____		

Indicate the parameters above that were analyzed by a DEP-certified laboratory:

ILLICIT DISCHARGES

Is the dry weather flow an illicit discharge? ☐ Yes ☐ No

If Yes, describe efforts made to determine the source(s) of the illicit discharge.

Describe corrective actions taken by the permittee in response to the finding of an illicit discharge.

Inspector Comments:

RESPONSIBLE OFFICIAL CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowledge of violations. See 18 Pa. C.S. § 4904 (relating to unsworn falsification).

Responsible Official Name	Signature
Telephone No.	Date

- 2 -

PennState

Training and Education Series

OPP Stormwater Management

Thanks for taking the time to view this presentation

If you would like additional information or have questions, comments, or suggestions, or for questions regarding the University's stormwater program contact Larry Fennessey, the University's stormwater operations engineer, at (814) 863-8743, or email: laf8@psu.edu