

Managing Water Intrusion in Schools

Moving from Reactive to Predictive Maintenance

SPELL Safety 360 Seminar – July 10, 2024

Moving from Reactive to Predictive

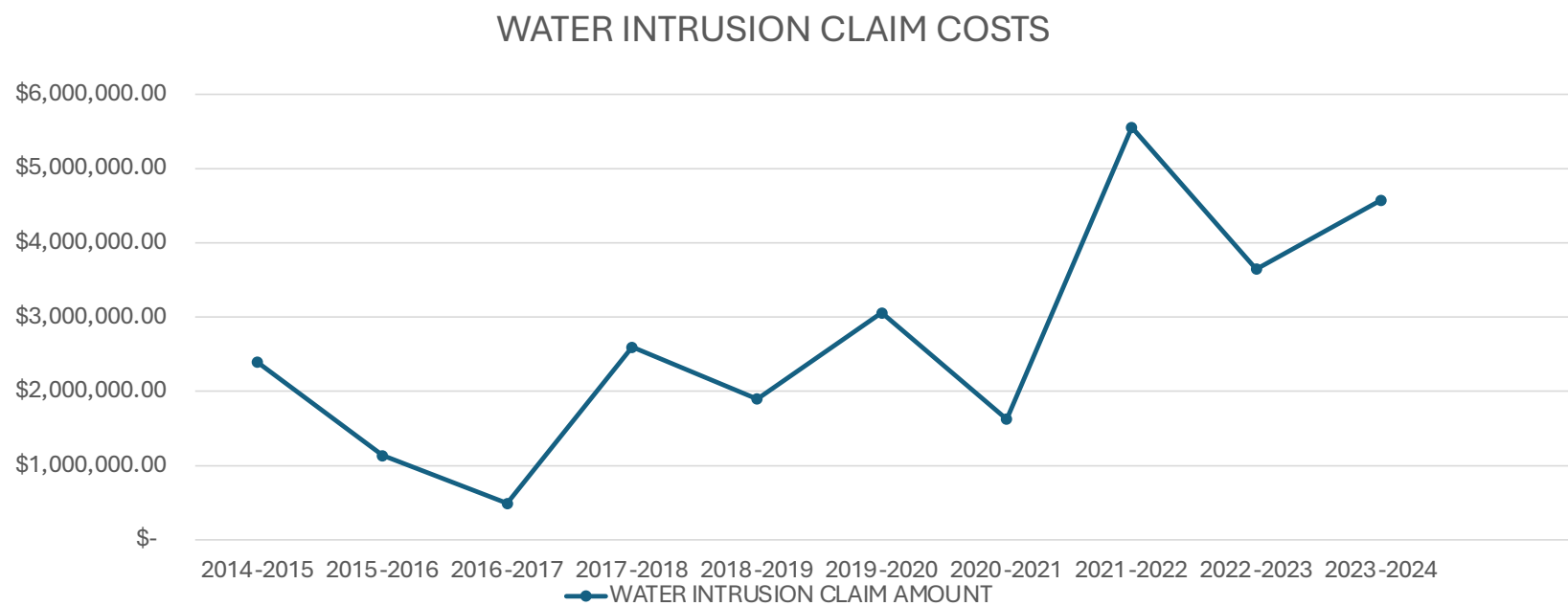
Water claims are serious, costly and disruptive. Schools need to manage and respond to water intrusions quickly and efficiently to limit their impacts. In the last 10 years, SPELL has spent:

\$ 26, 976,064.20

on water claims!

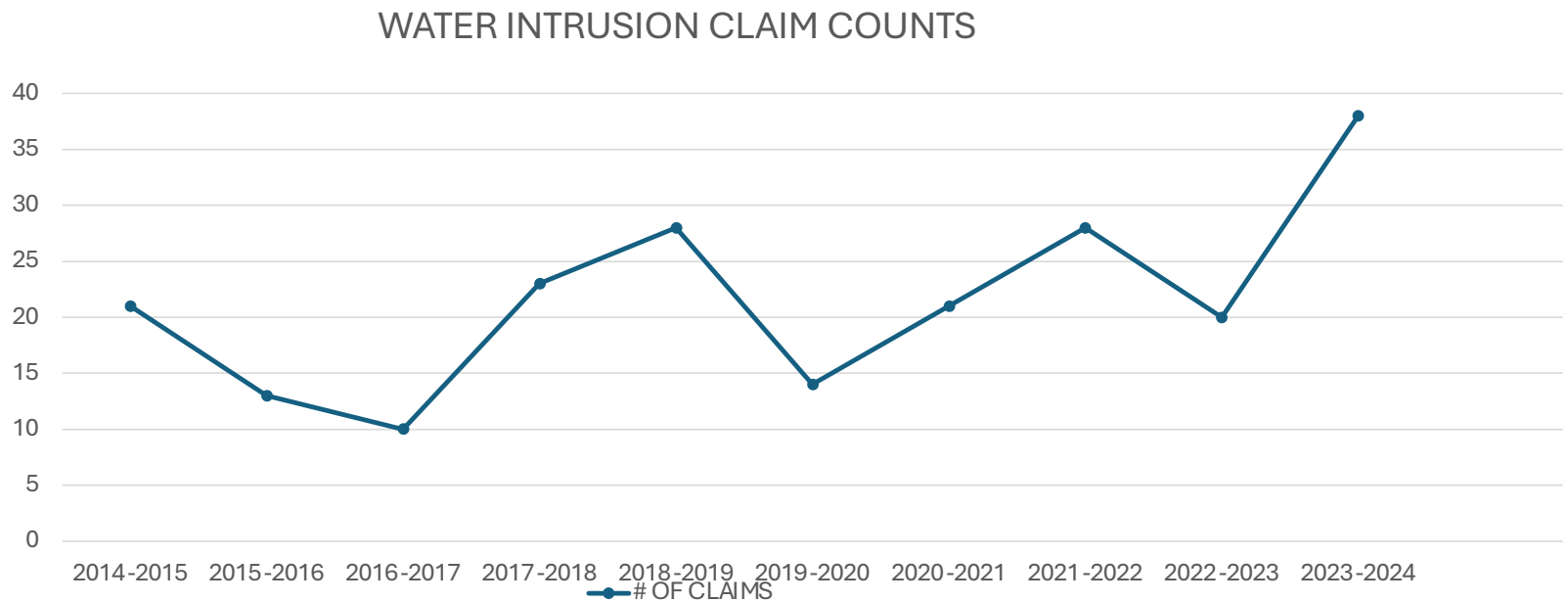
Moving from Reactive to Predictive

Averaging 2.6 million per year with a high claim of \$ 5.5 million in 2021-2022



Moving from REACTIVE to Predictive

Averaging 21 claims per year or 22% of members, with a high number of claims being 38 this year!





Water Intrusion in Schools

Challenges:

- Unlike businesses that run 24/7/365, schools are more exposed to higher severity water damage losses because buildings are often shuttered during the summer months and holiday periods.
- Most leaks stem from accidental discharge of water, such as:
 - Plumbing systems
 - HVAC condensate
 - Heating System failure in winter months or summer months
 - Deferred maintenance

WATER LEAK CATEGORIES

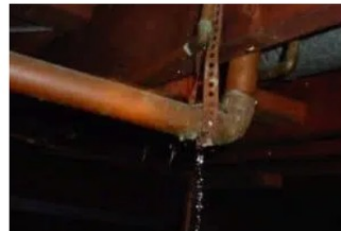
CATEGORY 1 Clean Water	CATEGORY 2 Grey Water	CATEGORY 3 Black Water
		
Originates from sanitary sources , such as broken supply lines or faucets.	Contains significant contamination , potentially causing discomfort or illness if consumed or contacted. Examples include washing machine overflow and dishwasher leaks.	Highly contaminated with pathogenic agents and fecal matter, posing severe health risks. Examples include sewage backups and flooding from rivers or oceans.

Water leak volume



A dripping leak can easily consume:

15 gal. per day
450 gal. per month



A 1/32 in. leak consumes:

264 gal. per day
7,920 gal. per month



A 1/16 in. leak consumes:

943 gal. per day
28,300 gal. per month / At 60psi, a 1/16" hole
leaks 74,000 gallons (9,850 cubic feet) in 3
months



A 1/8 in. leak consumes:

3,806 gal. per day
114,200 gal. per month / At 60psi, a 1/8" hole
leaks 296,000 gallons (39,400 cubic feet) in
3 months



A 1/4 in. leak consumes:

15,226 gal. per day
456,800 gal. per month / At 60 psi, a 1/4"
hole leaks 1,181,500 gallons (158,000cf) in 3
months



A 1/2 in. leak consumes:

60,900 gal. per day
1,827,000 gal. per month

Water Intrusion - SOP

You need a plan for who is responsible to respond to Water Intrusions:

- Who is responsible .
- Who they report issues to .
- What issues will be addressed internally.
- What internal resources you have.
- What issues will be addressed externally.

- Link to: [Water Intrusion Standard Operating Procedure Sample](#)

Water Intrusion Response Standard Operating Procedures¶

1. Purpose¶

The purpose of this document is to define responsibilities and a procedure for facility water intrusion and flood response, remediation, and insurance claim. Most flood and water intrusion events originate from freshwater supply line breaks, ground/rainwater infiltration, roof leaks, drain leaks, and sanitary line backups. Most are quickly identified and responded to by Buildings & Grounds. A successful flood and water intrusion response and remediation requires swift action, communication, and coordination with many district stakeholders to mitigate hazards, prevent mold growth, and restore the facility to normal operations.¶

2. Scope¶

This standard procedure applies to all <School District Name> facilities and employees. ¶

3. Responsibilities¶

3.1 <Certified Educational Facility Manager>> (CEFM)>¶

Provides service request support and notification to affected stakeholders for all facility-related emergencies, including floods and water intrusion events.¶

The designated responsible person who manages the facility flood response, remediation, and insurance claim process.¶

Provides notification to first and second-tier flood response and remediation personnel.¶

Perform hazard assessment to identify potential hazards (asbestos, biological, electric, overhead falling debris, water contamination, etc.) prior to work, and implement necessary health and safety controls to prevent incidents. Secure and barricade work area using signage, and barricade tape.¶

Maintains Facility Flood Response SOP.¶

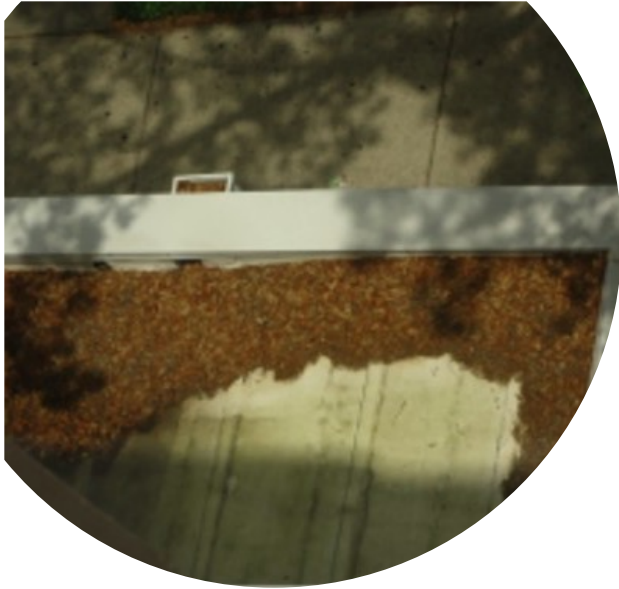
3.2 Buildings & Grounds Staff¶

- Provides 24/7 emergency response and cleanup services after a flood or other water intrusion event.¶
- using applicable techniques.¶
- Provides, on-scene access control, evacuations if necessary and coordination with local emergency responders.¶

Sources of Water Intrusions

- Roof leaks
- HVAC Leaks – Condensate/Supply Lines
- Plumbing Leaks:
 - Fire Sprinklers
 - Domestic Hot & Cold water
- Sewer/Septic – category 3 water
- Intrusion through building envelope
- External floods

Best Practice Roof Leaks



- **SOURCES:**

- Clogged drains and scuppers.
- Clogged gutters
- Ponding

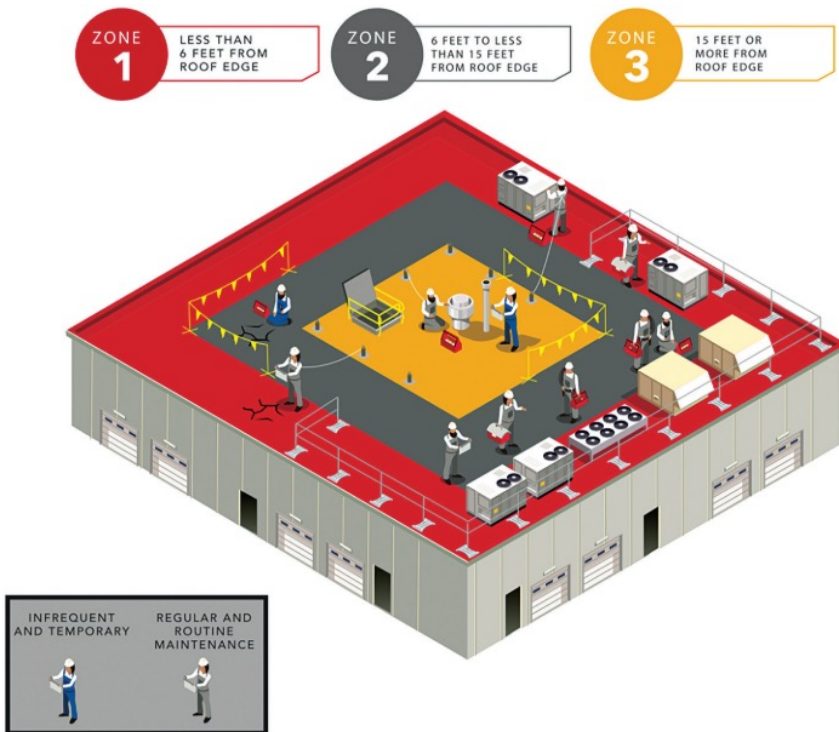
- **INSPECTION TECHNIQUES:**

- Aerial Inspection by Drone
- Engaging contractor for periodic roof inspection
- Sending B&G onto the roof (Not Suggested)
 - Use Caution – need to comply with OSHA:
 - Fall Protection Standard
 - Personal Protective Equipment
 - Ladder Safety Standard
 - Need Safety Rails & Systems in Place
 - See Roof Safety Refresher Slide

- **CHECKLISTS:**

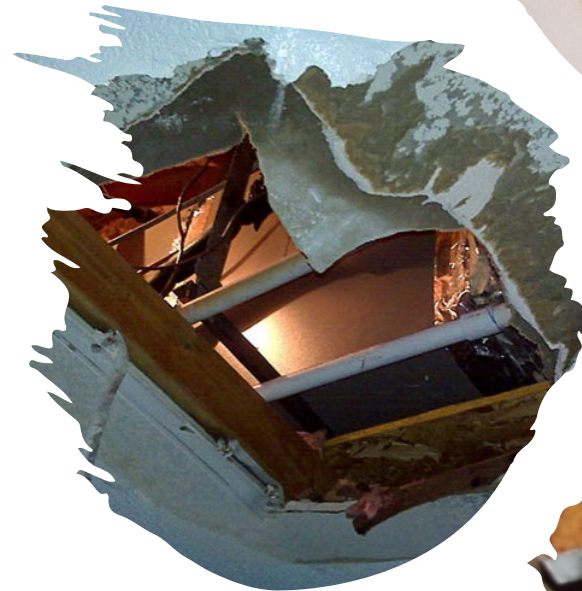
- [Safety 360 Roof Drainage Checklist](#)

REFRESHER ROOF SAFETY FALL PROTECTION



Best Practice HVAC Leaks

- Make sure HVAC drip pans and drain lines are clear.
- Consider placing a chlorine tablet in the pan.
- Test flush drain lines periodically, and condensate pumps prior to cooling season.
- Verify Insulation is on cooling supply Lines and condensate lines.
- Check if your building automation system (BAS) can monitor condensate pans and lines and turn off unit and alert you if there is a water buildup in the pan. Building .
- Consider using IOT leak sensor to be alerted before a small problem becomes a large one.
- Link: [Condensate Inspection Checklist](#)





Best Practice Fire Sprinkler Leaks



- Make sure seals are maintained and replaced.
- Ensure **periodic flushing** to prevent corrosion!
- Replace damaged sprinkler heads and covers
- Know your building – watch for freezing in the event of heating systems failure.
- Verify your sprinkler is maintained in accordance with NFPA 25.



Best Practice Domestic Plumbing Leaks

- Make sure floor drains are functional.
- Flush floor drains periodically.
- Monitor plumbing fixtures and piping.
- Fix small leaks before they grow!
- Consider using IOT leak sensor to be alerted to a leak as it happens.
- Consider using flow monitors on specific water supply lines, they sense normal usage and shut off water if flow is excessive.





Best Practice Category 3 Water Leaks

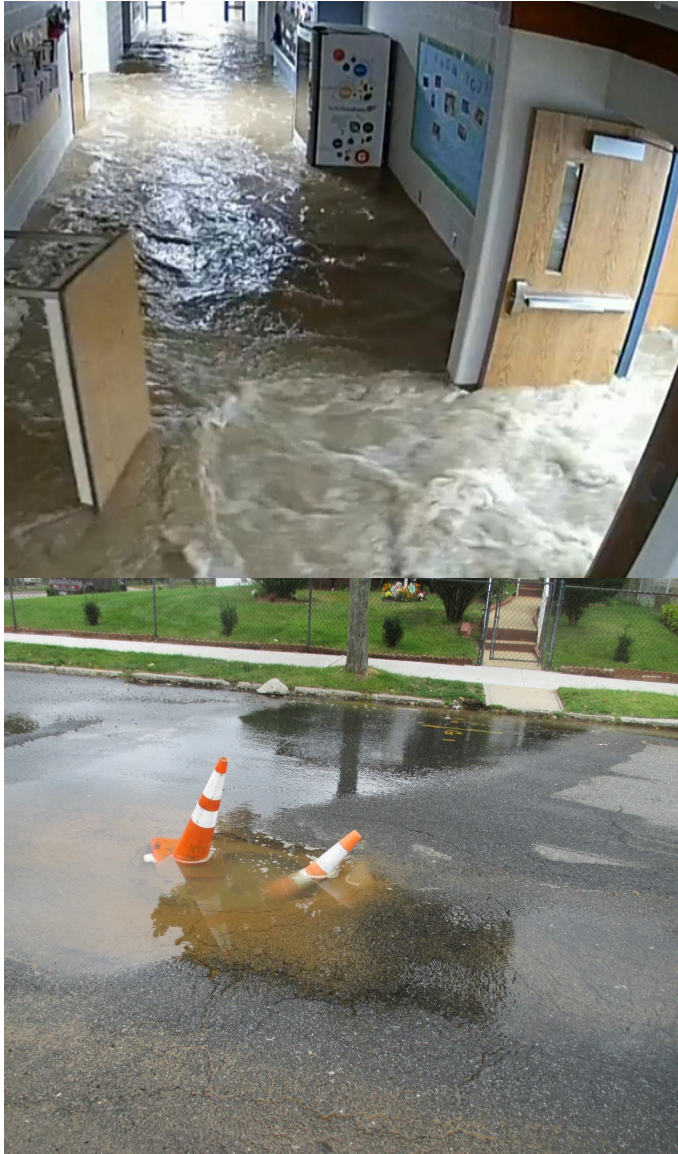
- Category 3 leaks can occur inside and outside your facilities
- Lifted manholes
- Strange brown water depressions
- Flooded basements check water first!
- Consider engaging outside vendor if your leak is “Category 3 Water”.



Best Practice Building Envelope Leaks

- Difficult to detect.
- Can require significant capital outlay to fix.
- Need to manage issue while long term solution is being developed.





Best Practice External Floods

- External Resources:
 - Town Office of Emergency Management(OEM)
 - Local Fire Department
 - County Office of Emergency Management(OEM)
 - FEMA
- Keep track of time, equipment, purchases and lost items
- Photograph and document the flooding and damage caused.

BEST PRACTICE LEAK RESPONSE

- Have a plan – with no plan, you are planning to fail.
- Have the resources onsite or in district to respond.
- Know how to file a claim.
- Know who files claims.
- SPELL is here to help with you Safety 360 Team.
- If you file a claim, SPELL Has a robust response including::
 - Insurance Adjustor
 - Certified Industrial Hygienist

LINK: [LEAK CART](#)



YOUR WATER INTRUSION TOOLS

Past

- You needed staff to report a leak or custodians to locate it.
- If you suspected leaks you needed to send staff to visually monitor the building.

Now

- You have access to the Safety 360 Team for help.
- You have access to the SPELL/Travelers IOT Program.

No School is immune to the possibility of a water leak occurring somewhere on campus. Consequently, the best way to avoid the resulting cost and disruption is through early detection and intervention. Real-time feedback provided by IoT-enabled water sensors offers peace of mind to facility managers at schools and other enterprises. It's one of the risk management tools to help prevent water damage.

Case for Using IOT Sensors

- Know when leak happens versus discovering leak Monday morning!
- Move from Reactive to Proactive.
- Know what's leaks, and when it starts.
- If pumps fail, your monitoring may alert you before your dealing with an overflow.
- Sensors provide quick notification in the event a flood starts while staff are not onsite.

WATER FLOW SENSORS

- Monitor water flow into your building – systems learn your normal consumption patterns and alert if flow is outside of normal range
- When paired with a controlled valve, these can be programmed to alert, then proactively shut off the water.
- Downside, large models for commercial buildings or chillers can be expensive.



IOT LEAK SENSORS

- Monitor for the presence of water. Place near sinks, water heaters, boilers, etc. F
- We will be reviewing the sensors available to SPELL Members in the next session.



Water Intrusion in Schools

- Need to actively monitor systems for leaks.
- Need to address small leaks before they become big leaks.
- Remember – ALL WET MATERIALS NEED TO BE REMOVED IN 48 HOURS! (*NJAC 12:100-14.4*)
- If we control water intrusion early, we limit the large flood event and mold concerns caused by it.
- SPELL JIF HAS the Safety 360 TEAM here to HELP. we have been where you are now, we have successfully implemented inspection routines, iot solutions, and programs to control and manage water intrusions.
- We are the service and support team of the SPELL that is free for you to use.

BREAK

Please Return at 10:30 a.m.

Water Intrusion Response Standard Operating Procedures

1. Purpose

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2. Scope

This standard procedure applies to all <School District Name> facilities and employees.

3. Responsibilities

3.1 <Certified Educational Facility Manager>< (CEFM)>

Provides service request support and notification to affected stakeholders for all facility-related emergencies, including floods and water intrusion events.

The designated responsible person who manages the facility flood response, remediation, and insurance claim process.

Provides notification to first and second-tier flood response and remediation personnel.

Perform hazard assessment to identify potential hazards (asbestos, biological, electric, overhead falling debris, water contamination, etc.) prior to work, and implement necessary health and safety controls to prevent incidents. Secure and barricade work area using signage, and barricade tape.

Maintains Facility Flood Response SOP.

3.2 Buildings & Grounds Staff

- Provides 24/7 emergency response and cleanup services after a flood or other water intrusion event, using applicable techniques.
- Provides, on-scene access control, evacuations if necessary and coordination with local emergency responders.
- Don the required Personal Protective Equipment Chart per the work tasks.
- Performs flood remediation activities to return the facility to normal operating conditions.

3.3 School Principal, or Department Head

- Ensure that affected building occupants have been notified of the event and provide temporary relocation of instructional space, office, or other space needs when necessary.
- Work collaboratively with CEFM, School Business Administrator, Risk Management, and/or other stakeholders as needs arise.

3.4 SPELL Insurance Property Adjuster

- Subject matter expert on insurance policy, and insurance claims.
- Interfaces with SPELL JIF on emergency recovery efforts.
- Facilitates contact with SPELL Certified Industrial Hygienist and Remediation Contractor, if needed.

3.5 SPELL Certified Industrial Hygienist

- Performs hazard assessment support, assists in planning, and performs inspection services to ensure necessary health and safety controls are implemented to prevent incidents.
- Performs assessment of flood or water intrusion event alongside CEFM to understand remediation activities and provide guidance to mitigate future mold and indoor air quality issues.

Water Intrusion Response Standard Operating Procedures

3.6 District School Safety Specialist

- Provides 24/7 emergency response, support, and notification services for campus emergencies. Services include, crowd control, documentation support, on-scene access control, evacuations, and coordination of local emergency responders when necessary.

4. Procedure

4.1 Flood Response

Upon identification of a facility flood or water intrusion event, the individual should immediately report the incident during work hours to the Buildings & Grounds Department at <B&G Phone> for assistance, after-hours please call the <CEFM>, <CEFM Emergency Phone>. If necessary, all affected personnel not involved in flood response shall be evacuated from the impacted area(s).

If the event poses an imminent risk to life or health to yourself or building occupants notify local Emergency Responders, by dialing 911 for emergency assistance.

Upon notification of a water intrusion, the <CEFM>, shall determine the extent of the flood by asking the following questions, and issue response notifications accordingly:

- Contact info for employee calling in the flood?
- Where did the flood occur? (building(s), room(s), specific location, etc.)
- Impact to district operations? (instruction, administration, utilities, etc.)
- What caused the flooding? (sprinkler leak, plumbing leak, roof leak, condensate leak, etc.)
- Does the flooding involve hazardous materials or other hazards? (chemicals, sewage, electrical, etc.)
- Is there standing/flowing water, or is the water puddling to a localized area?
- Is the flood still active?
- How much water was released/being released? (slow drip, steady stream, gushing, etc.)
- How long has the flood been occurring/how long did it last?

In the event of a Minor flood, where the impact is minimal or localized to a small area, no standing/flowing water, water release is minimal or is under control, or does not involve hazardous materials or other facility hazards such as electrical, sewage, or limited access areas, CEFM shall notify, School Business Administrator, and Building Principal or Department Head.

In the event of a Major flood, where an excessive amount of water is released impacting a large area, water release is active, standing/flowing water is present, flooding involves hazardous materials or other facility hazards, impact to multiple rooms/buildings or key campus operations, CEFM shall notify District School Safety Specialist, School Business Administrator, Superintendent of Schools.

The School Business Administrator, based on the report from the CEFM will file claim and report the incident to SPELL JIF. See Section 4.3 of this SOP.

Prior to response/entry into affected areas, responders shall gradually proceed room by room to assess the impacted area. If the flood occurred on the ground floor or a basement, take the stairs and do not take the elevator in case of standing water.

All responders shall perform a hazard assessment to identify potential hazards (asbestos, biological, chemical, electric, lab hazards, overhead falling debris, water contamination, etc.) and implement necessary health and safety controls to prevent incidents. It is important to determine the source of the water or type of liquid, and point of generation e.g., potable water, sewage or other drain-waste-vent line effluent, rainwater, or bulk chemical to enable hazard assessment.

Review the Right to Know Survey for the affected area.

Water Intrusion Response Standard Operating Procedures

If hazards exist STOP wait for the Insurance Adjuster and CIH to develop a plan to control or eliminate real and potential hazards.

If necessary, <CEFM> shall deenergize any electrical systems, or equipment in the affected areas at a location (mechanical room, electric vault) where it is safe to do so.

Evaluate water or liquid migration route to determine whether there was any potential for contamination along its path.

If water is believed to be contaminated with a chemical or is a chemical, stop work and contact 911.

Evacuate building occupants from the affected area.

If a flood or water intrusion event displaces a large number of occupants contact 911 for evacuation and crowd control support.

Evaluate affected area and infrastructure to determine the cause of flood, or water intrusion, and then perform required work to stop or mitigate the active flood or water intrusion.

If a flood or water intrusion event appears to be caused by criminal activity, such as intentional property damage, or vandalism contact 911 for criminal investigation.

Secure and barricade work area using signage, barricade tape, or equivalent.

Perform clean-up of free-standing water or liquid, and any debris caused by flood or water intrusion events. If flood water is contaminated with chemical or other hazardous materials CIH to provide a remediation plan, and support.

Following the initial clean-up of the affected area, the affected floors and on-porous finishes and fixtures shall be mopped or wiped using an approved disinfectant.

Install and set up dehumidifiers, and fans in the affected areas. If possible, coordinate with <CEFM> to increase HVAC systems ventilation rates in affected areas or facility.

Always install dehumidifiers for multi-floor and/or multi-room flood events.

Remediation Contractor is available to provide equipment rentals (dehumidifiers, fans, etc.) and other services.

Dehumidifier, blower, and fan strategies for more effective dehumidification:

- Remove a portion of the drywall on one side of the wall to enable the wall to dehumidify from inside and outside (Check for asbestos first).
- Remove floor trim install and direct fans or blower towards the base of wall and floor. If no gap between wall and floor, consider cutting 4-6" of the bottom of the wall to allow a larger air gap (Check for asbestos first). Generally, the base of the wall is more saturated than the upper portion of the wall.

CEFM should ensure that affected building or department representatives have been notified of the event.

Water Intrusion Response Standard Operating Procedures

4.2 Flood Remediation

The CEFM is responsible for the management of all remediation activity, including communication with stakeholders and the coordination of the insurance claim with the School Business Administrator.

As soon as possible, the CEFM should validate the appropriate flood response activities that occurred; water cleaned up, leak stopped, dehumidification in place, fans in place, communication to relevant stakeholders.

As soon as possible, the CEFM should determine the level of damage to the affected area, work with the SPELL CIH to develop a scope of work, determine the presence of hazardous building materials such as asbestos and lead in the affected area, and plan for remediation activities by district staff or outsider vendors.

To assess damage and scope of demolition moisture metering should be performed after the flood response has occurred:

- For clean water floods, demolition, and replacement of damaged surfaces and building materials can be minimized by drying down the affected area within 24 - 48 hours. Failure to effectively dry areas down within these timeframes can lead to mold growth and material damages that require a full replacement. It is especially important to remove water thoroughly from carpeting within this timeframe because mold will begin to form. If this is not possible or if the carpeting or backing is damaged from mold, then it may need to be removed and replaced. Before removing carpeting or mastic or floor tiles below or any other type of demolition walls to contact the CEFM to determine whether there is any asbestos-containing material present.
- Prior to moisture metering affected areas always establish a baseline of percent moisture on porous materials unaffected by the flood. If the baseline is greater than 15% use that percent moisture to determine saturated material. Humidity levels outside may affect moisture levels of porous materials inside depending on the facility.
- Use meter to assess porous materials in the area affected by the flood. Mark saturated areas with a marker for demolition.
- If sheetrock, drywall, carpet backing remains saturated (20%-100% moisture) after 24-48 hours of flood response work with CIH and determining the removal of all saturated material to expose framing and/or subfloor. Continue to inspect for mold on interior portions of the wall and monitor for mildew-related odors.

CEFM should determine if the remediation activity will require a building permit and should facilitate the permitting activity.

CEFM will issue service requests to the appropriate account for tracking costs and reimbursement(s).

CEFM and Insurance Property Adjuster should meet at the affected area for all multi-room, and multi-floor facility flood and water intrusion events.

CEFM and Insurance Property Adjuster should meet at the affected area for all equipment claims greater than \$10,000.

Relocate valuable equipment and supplies to an unaffected area or cover and protect with plastic sheeting.

Coordinate with CIH for wall and ceiling demolition as soon as possible to prevent mold, mildew, odors, and future issues.

Dehumidifiers and fans should be repositioned after demolition to improve their effectiveness.

Coordinate the remainder of demolition activities in the scope of work.

Allow adequate time for structural building materials in the affected areas to dry. Do not reinstall building material until framing and subfloor is visibly dry and moisture content is at or below baseline or below 15%.

Water Intrusion Response Standard Operating Procedures

Once structural building materials in the affected areas are dry, reclean all affected areas using an approved disinfectant and allow the area to fully dry.

Install new building materials, finishes, fixtures, and equipment to return the facility to normal operations.

The CEFM, and any other determined participants will conduct an after-action review of the flood event, to determine any lessons learned and opportunities to improve SOP, health and safety practices, and notification strategies.

4.3 Insurance Claim

4.3.1 Property Claim Procedures:

Complete the [Incident Reporting Form](#)

Complete the [Claims Transmittal Form](#)

Fax these two forms to 609-926-9270

Complete & Submit the [Property Loss Claim Reporting Form](#)

4.3.2 Environmental Liability (Mold) Claim Procedures:

Complete & Submit the [Claim Form](#)

Call Chris Roselli from Qual-Lynx at 609-287-8569 to confirm receipt.

Call Beazley at 800-347-4384 to confirm receipt.

4.3.3. SPELL JIF Program Administrators

Risk Program Administrators (RPA)

6000 Sagemore Drive, Suite 6203

Marlton, New Jersey 08053

T: (856) 446-9100

F: (856)446-9149

Brad Hoffman, Executive Director

T: (856)446-9132

E: brad_hoffman@rpadmin.com

Scott Tennant, Deputy Executive Director

T: (856)446-9181

E: scott_tennant@rpadmin.com

Craig Wilkie, Deputy Executive Director

T: (856)446-9128

E: craig_wilkie@rpadmin.com

4.3.4. Property Loss Claim

Chris Roselli, Qual-Lynx

609-287-8569

chris.roselli@qual-lynx.com

SPELL Safety 360 Program

Roof Drainage Maintenance Guide

Proper roof drainage is essential for maintaining the integrity of your school building. From understanding how your roof, whether flat, or pitched drains, to tackling standing water in gutters, scuppers, roof drains, and crickets, we cover everything you need to know to maintain effective roof water drainage.

Understanding Roof Drainage Systems

Water damage can impact the operation of your school, interrupting instruction, increasing maintenance costs, and causing accidents, and effecting indoor air quality. The first step to protecting your school building from water damage is understanding the roof draining system.

- **Gutters and downspouts** direct water on roofs away from buildings, protecting both the building exterior and the foundation and keeping water from running off the roof straight down the side of the building to the foundation.
- **Internal drains & crickets** run water from the roof into pipes that go through the building; these usually discharge into a storm sewer system.
- **Scuppers** are openings at a building's perimeter that allow water to drain into a downspout; usually located by a metal box that acts as flashing and directs water to run through the wall.

Common Roof Drainage Issues and Their Consequences

The roof gets more abuse from the elements than any other part of a building. Be sure to avoid these three common roofs draining issues and their consequences:

- **Clogging hazards**—Debris, leaves, branches, and ice can quickly clog drains, scuppers, crickets, and downspouts especially during a heavy storm.
- **Standing water on flat and pitched roofs**—One inch of standing water adds five pounds per square foot of roof, or about 2,000 pounds of weight on a 20' x 20' square foot roof. And if drains or gutters are clogged, even a slanted roof can have standing water, resulting in foundation or structural problems.
- **Potential damage to roofing materials and building foundations**—Standing water can also deteriorate roofing materials, such as membranes and shingles, and can work its way under flashing and other sealants. Additionally, a freeze-thaw cycle can cause cracks in many roofing materials, allowing water to seep through to the interior.

Maintaining Optimal Roof Drainage

Being observant and proactive when it comes to roof maintenance is important to keep drains flowing. We recommend these tips:

- Inspect and clean roof drainage systems regularly, ideally on a periodic schedule, and before or after every severe weather.
- Remove obstacles and debris from roofs and gutters and keep tree branches away from the roof so leaves downed tree limbs don't clog roof drains.
- Thoroughly clean and inspect gutters and downspouts, including running water through them to ensure they aren't clogged. Be sure to check for sagging, leaking, loose connections and broken or missing fasteners as well.
- Repair any cracks and ensure that strainers are secure.
- Promptly address standing water issues.
- Redirect water away from the building.
- Consider upgrading roof drainage components during re-roofing or gutter replacement projects.

By following proper maintenance practices, you can ensure that your roof drainage system functions optimally, preventing potential damage to your building. Regular inspection, cleaning and timely repairs will help you maintain an efficient roof water drain and protect your investment for years to come.

<School District Name>
HVAC CONDENSATE & DRIP PAN INSPECTION CHECKLIST

Building Name: _____ **Date of Inspection:** _____

1. Did you inspect all HVAC condensate lines and drip pans? _____ Yes _____ No
2. Were any lines and pans inaccessible for inspection? _____ Yes _____ No
If yes, why? _____
3. Did you verify there were no clogs present ? _____ Yes _____ No
4. Did you check the note any cracks, holes, rust or mold? _____ Yes _____ No
5. Were brutabs placed in any drip pans? Note locations in comments below. _____ Yes _____ No
6. Was work ordered any for any cracked drips pans in need of replacement? _____ Yes _____ No
8. Did you report any foreign debris found in drip pans to CEFM so they could share with Building Administrators _____ Yes _____ No

Important note: If a serious problem is identified during your inspection, contact <Certified Educational Facility Manager Name> at < CEFM Email> or <CEFM Phone>. Also, if you have any questions or need assistance completing this checklist, please contact the <Certified Educational Facility Manager Name>.

Inspection Completed by: _____ ***Date:*** _____

Notes on Inspections:

Brutabs place in locations noted on log below.

Building Name: _____ **Date of Inspection:** _____

[illegible]

Leak, Moisture Control & Mold Response Cart

One of these carts, per every 30,000 square feet of building space, has been deployed to each school in the district. At present we have 10 carts spread among the district's 5 school buildings.

These carts exist to ensure we can quickly respond and remediate leaks, water intrusion into the building envelope and floods.

Training will be held with all custodial staff at the beginning of each year, reviewing the carts use, and how and when we respond to water events. Check with your head custodian for cart storage location, remember all leaks, floods and water intrusions must be reported to the Manager of Buildings & Grounds immediately!






36"x24"x72" Cart with Heavy Duty Wheels & Cabinet

Drying Equipment Store on each cart:

Photo of Equipment	Description	Quantity per Cart
	Dri Eaz 113163 Air Mover 115V	2
	DriEaz HEPA 500 Air Scrubber	1
	Phoenix DryMax XL Dehumidifier	1
	50' Extension Cords – Light Indicator	4
	100' Extension Cords – Light Indicator	2


Sensing/Measurement Equipment Store on each cart:

Photo of Equipment	Description	Quantity per Cart
	EXTECH Moisture Meter 1.5% to 33% Building Materials 5%-50% Wood	1
	EXTECH Psychrometer with Infrared	1
	EXTECH Indoor Air Quality CO2 Meter	1

Flood/Leak Response Equipment on Each Cart



Photo of Equipment	Description	Quantity per Cart
	Little Giant Utility Pump	1
	Quick Dam Portable Flood dam, 30 Pack 4' Long	1
	Spring Open Leak Diverter 30"	2




Clean Up Chemicals on Each Cart

Photo of Equipment	Description	Quantity per Cart
	BruTabz	1 Tubs

	H2Orange	1 Gallons
	1 Quart Cleaning Pail	2
	12 Pack of Microfiber Cleaning Cloth	2 Packs

PPE on Each Cart

Photo of Equipment	Description	Quantity per Cart
	N-95 Mask, NIOSH	4
	Safety Goggles	4

		15 mil Nitrile Gloves	4Pairs
		Rubber Boot	2 Pairs
		Tyvek Coverall	4

SPELL Safety 360 Program

How to Protect Your Building from Water Damage

Water damage can diminish the value of your school building and result in increased maintenance costs, loss of instructional time and a decline in indoor air quality (all potential liabilities).

The best way to protect your school property from water damage is to ensure the building components that enclose your structure, or the building envelope, are water resistant. You also want to ensure your current operating processes don't allow excess water to accumulate and make sure that all plumbing and ventilation systems—which can be quite complicated in school buildings—operate efficiently and are well maintained.

Finding and Repairing Water Damage

Identifying, and repairing, leaks and cracks is usually the key to water-related issues. Below are common building-related sources of water damage to be aware of.

- **Windows and doors**—Check for leaks around your windows, storefront glass door systems, and doors.
- **Roof**—Improper drainage systems and roof sloping reduce roof life and become a primary source of moisture intrusion. Leaks are also common around vents for exhaust of plumbing, HVAC units or other specialized equipment.
- **Foundation and exterior walls**—Seal any cracks and holes in exterior walls, joints, and foundations. These often develop as a naturally occurring byproduct of differential soil settlement.
- **Plumbing**—Check for leaking plumbing fixtures, dripping pipes (including fire sprinkler systems), clogged drains (both interior and exterior), and defective water drainage systems.
- **Ventilation, heating, and air conditioning (HVAC) systems**—Numerous types, some very sophisticated, are a crucial component to maintaining a healthy, comfortable work environment. They are comprised of several components (including chilled water piping and condensation lines and pans, drains) that can directly contribute to excessive moisture in the work environment. Additionally, in humid climates, one of the functions of the system is to reduce the ambient air moisture (relative humidity) level throughout the building. An improperly operating HVAC system will not perform this function.

Preventing Water Intrusion

You can help prevent water intrusion and excessive moisture levels through quality inspection and maintenance programs. You'll want to regularly inspect the following elements of your building to ensure they remain in good condition:

- **Flashings and sealants**—Flashing, which is typically a thin metal strip found around doors, windows, and roofs, is designed to prevent water intrusion in spaces where two building materials come together. Sealants and caulking are specifically applied to prevent moisture intrusion at building joints. Both must be maintained and in good condition.
- **Vents**—All vents should have appropriate hoods, exhaust to the exterior and be in good working order.
- **Heating, ventilation and air conditioning systems**—Check for leakage in supply and return water lines, pumps, air handlers and other components. Drain lines should be clean and clear of obstructions. Ductwork should be insulated to prevent condensation on exterior surfaces.
- **Humidity**—Except in specialized facilities, the relative humidity in your building should be between 30% and 50%. Condensation on windows, wet stains on walls and ceilings and musty smells are signs relative humidity may be high. If you are concerned about the humidity level in your building, consult with a mechanical engineer, contractor, or HVAC company to determine if your HVAC system is properly sized and in good working order. A mechanical engineer should be consulted when renovations to interior spaces are planned.
- **Moist areas**—Regularly clean off and dry all surfaces where moisture frequently collects.

- **Expansion joints**—Expansion joints are materials between bricks, pipes and other building materials that absorb movement. If expansion joints are not in good condition, water intrusion can occur.
- **Interior finish materials**—Replace wet drywall, plaster, carpet and stained or water damaged ceiling tiles. These are not only good evidence of a moisture intrusion problem, but can lead to deterioration of the work and instructional environment, over time, if they remain.
- **Exterior walls**—Exterior walls are generally comprised of several materials combined into a “wall assembly.” When properly designed and constructed the assembly is the first line of defense between water and the interior of your building. It is essential that they be maintained properly (including regular refinishing and/or resealing with the correct materials).
- **Storage areas**—Storage areas should be kept clean and allow air to circulate to prevent potential moisture accumulation.

Act Quickly When Water Damage Occurs

Label shut-off valves so water supply can be easily closed if a plumbing leak occurs. If water intrusion does occur, you can minimize the damage by addressing the problem quickly and thoroughly. Immediately remove standing water and all moist materials and consult with a building professional.

Should your building become damaged by a catastrophic event such as fire, flood, or storm, take appropriate action to prevent further water damage once it is safe to do so. This may include:

- Boarding up damaged windows
- Covering a damaged roof with plastic sheeting
- Removing wet materials and supplies.

Acting fast will help minimize the time and cost for repairs—resulting in a faster recovery.

SPELL Safety 360 Program

Roof Drainage Maintenance Guide

Proper roof drainage is essential for maintaining the integrity of your school building. From understanding how your roof, whether flat, or pitched drains, to tackling standing water in gutters, scuppers, roof drains, and crickets, we cover everything you need to know to maintain effective roof water drainage.

Understanding Roof Drainage Systems

Water damage can impact the operation of your school, interrupting instruction, increasing maintenance costs, and causing accidents, and effecting indoor air quality. The first step to protecting your school building from water damage is understanding the roof draining system.

- **Gutters and downspouts** direct water on roofs away from buildings, protecting both the building exterior and the foundation and keeping water from running off the roof straight down the side of the building to the foundation.
- **Internal drains & crickets** run water from the roof into pipes that go through the building; these usually discharge into a storm sewer system.
- **Scuppers** are openings at a building's perimeter that allow water to drain into a downspout; usually located by a metal box that acts as flashing and directs water to run through the wall.

Common Roof Drainage Issues and Their Consequences

The roof gets more abuse from the elements than any other part of a building. Be sure to avoid these three common roofs draining issues and their consequences:

- **Clogging hazards**—Debris, leaves, branches, and ice can quickly clog drains, scuppers, crickets, and downspouts especially during a heavy storm.
- **Standing water on flat and pitched roofs**—One inch of standing water adds five pounds per square foot of roof, or about 2,000 pounds of weight on a 20' x 20' square foot roof. And if drains or gutters are clogged, even a slanted roof can have standing water, resulting in foundation or structural problems.
- **Potential damage to roofing materials and building foundations**—Standing water can also deteriorate roofing materials, such as membranes and shingles, and can work its way under flashing and other sealants. Additionally, a freeze-thaw cycle can cause cracks in many roofing materials, allowing water to seep through to the interior.

Maintaining Optimal Roof Drainage

Being observant and proactive when it comes to roof maintenance is important to keep drains flowing. We recommend these tips:

- Inspect and clean roof drainage systems regularly, ideally on a periodic schedule, and before or after every severe weather.
- Remove obstacles and debris from roofs and gutters and keep tree branches away from the roof so leaves downed tree limbs don't clog roof drains.
- Thoroughly clean and inspect gutters and downspouts, including running water through them to ensure they aren't clogged. Be sure to check for sagging, leaking, loose connections and broken or missing fasteners as well.
- Repair any cracks and ensure that strainers are secure.
- Promptly address standing water issues.
- Redirect water away from the building.
- Consider upgrading roof drainage components during re-roofing or gutter replacement projects.

By following proper maintenance practices, you can ensure that your roof drainage system functions optimally, preventing potential damage to your building. Regular inspection, cleaning and timely repairs will help you maintain an efficient roof water drain and protect your investment for years to come.

I. General Information			
Procedure Title	Sewage Overflow Emergency Response Procedures		
Departments	Buildings & Grounds		
Estimated Start Date:		Estimated Start Time:	
Estimated End Date:		Estimated End Time:	
Work Area:			
Equipment Required:	Shop Vacuum with tank; microfiber cloths; microfiber mops; large trash bags; duct tape; absorbent socks & spill pads;		
Buildings/Systems Affected:	Plumbing		
Required Safety Measures:	Proper Bloodborne Pathogen safe work practices & PPE must be used.		
Required Personal Protective Equipment:	waterproof full-body tyvek suit or equivalent; rubber boots; forearm length rubber neoprene or nitrile gloves; a dust mask to cover the mouth and nose; splash goggles;		
Required Notifications:	Manager of Buildings & Grounds/CEFM		
Required Permits/Forms/Authorizations:			
All required permits, forms, authorizations, and procedures must be submitted to the staff member in charge of the work and Manager of Buildings & Grounds/CEFM once the work is complete.			

II. Preliminary Procedure	Person(s) Involved
1. In the event of a sewage backup or flooding event the first point of contact shall be the school or building custodian for the affected building or common area. The custodian shall then contact the <Manager of Buildings & Grounds/CEFM>as soon as possible, to oversee the response.	
2. The Office of Buildings & Grounds shall respond to oversee the cleanup as soon as feasible. If necessary, the <Manager of Buildings & Grounds/CEFM shall assign extra personnel to aid in the cleanup as they see fit. <Manager of Buildings & Grounds/CEFM shall also ensure appropriate cleanup equipment is available including drum vacuum for bulk liquids and solids, as well as appropriate disinfectant cleaning solution.	

III. Procedure	Estimated Duration	Person(s) Involved
1. Secure the affected area from unauthorized entry by students or faculty. This can be done using signage, caution tapes or cones. If water line has reached or has potential to reach electrical sources the <Manager of Buildings & Grounds/CEFM> must be called in to turn off appropriate power sources. If spill reaches a confined space or any area not designed for human occupancy, custodial personnel are not permitted to enter that area.		
2. Set up an isolation zone outside of the affected area where responding personnel can put on and remove their personal protective equipment (hereafter referred to as PPE)		
3. All personnel should next put on their PPE in the isolated zone. PPE must include all of the following: a waterproof full-body Tyvek suit or equivalent, rubber boots, forearm length rubber, neoprene or nitrile gloves, a dust mask to cover the mouth and nose and splash goggles or equivalent eye protection. For review of how to properly put on and take off PPE, please ask the <Manager of Buildings & Grounds/CEFM>.		
3. Before entering the affected area try to isolate any routes of entry of the sewage into the environment such as doors or storm water drains. This can be done using absorbent socks or spill pads.		
4. Begin removing bulk liquids with the drum vacuum and emptying into nearest sewer manhole, which shall be identified by <Manager of Buildings & Grounds/CEFM >. If <Manager of Buildings & Grounds/CEFM > is not available sewage can be dumped into a functioning toilet in another building or area.		
5. Once bulk liquids have been removed response personnel shall begin disinfecting hard surfaces such as flooring and walls with an appropriate disinfectant solution. Remove all saturated surfaces such as carpeting or plaster materials, spray with disinfectant solution, and then place materials bagged and goose neck taped in dumpster.		
6. Continue disinfection of all affected areas.		

III. Procedure	Estimated Duration	Person(s) Involved
7. Remove contaminated PPE in a designated area taking care to touch affected areas with bare hands as little as possible (gloves should be removed last)		
8. Splash goggles and boots can be disinfected and re-used at discretion of user, all other PPE should be bagged, sprayed with disinfectant, and thrown in normal trash.		
9. Splash goggles and boots can be disinfected and re-used at discretion of user, all other PPE should be bagged, sprayed with disinfectant, and thrown in normal trash.		
10. Upon completing clean up procedures all personnel who entered the work area should immediately wash their hands with warm water and soap for a minimum of 30 seconds. If possible, personnel are also advised to shower and change clothes as an extra precaution, as soon as possible.		

IV. Exposure and First Aid Procedures, if necessary

- Any personnel who believe they were exposed to raw sewage through their eyes, mouth, nose, ears or a cut should immediately wash the affected area with warm water and antibacterial soap. Employees shall file the appropriate accident report for the exposure with the Business Office or the Nurse's Office if school is in session.

V. Authorization of the Work to be Performed

<School District Name> Departmental Administrators and Principals, the Contractor Supervisor (if applicable), and the <School Buildings & Grounds Manager> , or their designees, must review and sign this Safe Operating Procedure prior to the commencement of work, approving/authorizing the work to be performed as specified in the Safe Operating Procedure. Without all signatures, work cannot proceed.

Name	Title/Company (if Contractor)	Signature/Date

VI. Acknowledgement of the Safe Operating Procedure		
All persons involved in the work, including <School District> employees must review, acknowledge, and agree to comply with all the procedures and safety requirements outlined in this Safe Operating Procedure by signing below prior to the commencement of work.		
Name	Title	Signature/Date

VII. Notes
Write any noteworthy information here, including issues noted during the work or deviations from the outlined Safe Operating Procedure, which must be relayed to and approved by all who authorized the Safe Operating Procedure.