Course Overview, Course Goal, and Objectives

The Federal Emergency Management Agency (FEMA) Public Assistance Program aims to make the grant application process easier to understand for Applicants and Recipients. FEMA wants to provide in-depth training in policy and process to Applicants and Recipients to bring clarity to the Public Assistance process, specifically regarding water and wastewater treatment system considerations.

By the end of this course, students will be able to:

- Describe Public Assistance policy and guidance related to water and wastewater treatment systems
- Identify common reasons why water and wastewater treatment systems projects are deemed ineligible for Public Assistance grant funding
- Identify documentation considerations associated with water and wastewater treatment systems, including documenting damage prior to repair
- Identify special considerations for eligible water and wastewater treatment systems projects

Select this link to access the Public Assistance acronym list.

Lesson 1 Overview

This lesson provides an overview of water and wastewater treatment systems, including examples of water and wastewater treatment systems, facilities, and distribution networks.

By the end of this unit, students will be able to:

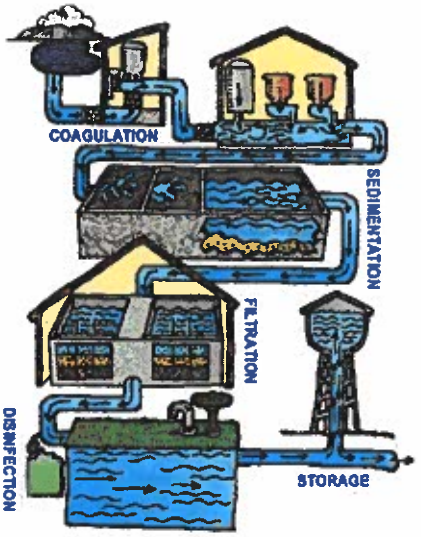
- Describe the different components of water and wastewater treatment systems
- Identify types of water and wastewater treatment facilities and distribution networks

Select this link to access a full image description.

Water and Wastewater Treatment Systems

Domestic water heaters, domestic water booster pumps, and hot water circulating pumps and system controls should be placed above anticipated flood levels. Pressurized piping can be installed in areas vulnerable to flooding, but the amount of piping exposed to floodwaters should be minimized to facilitate cleanup.

If components such as sump pumps, lift pumps, or macerator pumps that discharge effluent must be installed in areas vulnerable to flooding, the components and associated controls should be designed for submersible use.



Components of Water and Wastewater Treatment Systems

A wastewater treatment system is the process of collecting and processing sewage, and is generally split into three areas: Collection; Transmission; and Treatment.

Sewage Collection (1 of 3)

Sewage Collection - Pipes, Manholes, Lift stations.

Sewage flows by gravity through service lateral from homes, businesses, industry, etc. to a sewer main in the street. A community will have a network of gravity mains that connect to each other at manholes.

Small pipes (e.g. 8-inch diameter) feed into larger pipes. Sewer pipe material is general PVC, but some systems use concrete pipe and others use vitrified clay pipe.

Sewer manholes are generally constructed of concrete rings, older systems may have brick manholes and sometime fiberglass is used.

Sewage Collection (2 of 3)

The sewer mains must be installed deep underground to provide service to users and avoid other utilities like water lines. Sewers also need to slope continuously downhill for continuous flow of the sewage. At some point the pipes are so deep, or there is an obstacle like a river, that it's not practicable for the pipe to continue. At this point a sewage lift station is constructed that serves the basin of users located upstream from the lift station.

A lift station may have many configurations but generally they have a deep well (perhaps 20 to 30 feet deep) where sewage collects. The depth of sewage is monitored and at a certain point a switch is triggered and pumps driven by electric motors kick on and the well is pumped out. This cycle continues and, for example, is more frequent in the morning when residents are showering and less frequent late at night when residents asleep.

A lift station always has at least two pumps for redundancy and extreme high flow conditions when both pumps are needed. A two-pump lift station is called "duplex". A three-pump lift stain is called "triplex". The pumps and motors can be located above ground, below ground in a "dry well", or submerged directly in the sewage. A submersible pump is a sealed unit that has both the pump and motor.

Sewage Collection (3 of 3)

Wet wells are the holding sump for gravity-flow sewer systems. As sewage enters the wet well and the water level rises, pumps are engaged to pump out the sewage to a forced main, or the sewage is lifted to a higher grade to continue the gravity flow to the outlet point.

The level of sewage in the "wet well" is monitored and controlled by:

- Float switches that reside in the liquid
- Ultrasonic level sensors

- "Bubblers" that detect pressure

The pump motors are controlled by devices located in the motor control panel. They receive signals that turn the pump motors on and off at the appropriate time.

The motor control panel may also:

- Monitor electric current and phase
- Have overload protection
- Communicate with the system operator
- Sound a warning alarm or turn on a warning light
- Allow manual operation
- Record motor run times

A lift station may also have a backup generator if the grid electric system fails. A generator requires an automatic transfer switch that switches the lift station from grid electric power to generator electric power automatically.

Transmission

Sewage Transmission refers to pumping sewage under pressure from one location to another. Typically, sewage is pumped from a sewage lift station to either:

- Manhole, to another lift station
- Treatment facility

The pipe that transmits the sewage is referred to as a "force main". A force main is made of heavy durable material like PVC or ductile iron to ensure that there are no leaks and it is not easily damaged.

Treatment (1 of 2)

Treatment of wastewater is a necessary and expensive process. There are many theories of how wastewater should be treated and multiple types of systems to achieve the treatment goals.

Every treatment facility is permitted by a local agency. The volume of treated wastewater discharge (called effluent), the exact point of discharge, and the quality of the treated effluent is strictly regulated by the governing agency. There are three levels of wastewater treatment: Primary, Secondary and Tertiary.

1. Primary is settling the solids and draining of the liquid (like a septic tank).
2. Secondary where the sewage is settled followed by a biological process to reduce the strength of the sewage.
3. Tertiary includes primary and secondary processes followed by filtration through a sand filter or other type of filter.

The general case is that sewage is collected and then transmitted to the treatment facility by gravity sewer pipe or pressure force main or both. Often the sewage is pumped at an onsite lift station to a higher elevation and then flows by gravity through the treatment process.

Treatment (2 of 2)

The "headworks" of a wastewater treatment plant is the initial stage of a complex process. This process reduces the level of pollutants in the incoming domestic and industrial wastewater to a level that will allow the treated wastewater or effluent to be discharged into a stream, river or lake.

At the headworks there is a screen that removes solids, trash, etc. and this material is taken to a landfill. This may be followed by a grit chamber where sand and grit is removed. There may be a grinder in the process that macerates the sewage.

This is typically followed by:

- Aeration basin where air is pumped through the liquid allowing beneficial aerobic organism to reduce the strength of the sewage
- Followed by clarifiers where suspended solids are settled out
- Liquid from the clarifiers is dosed with chlorine for disinfection in the chlorine contact basin then discharged to the receiving steam

Many chemicals are typically used in the process to:

- Aid settling
- Change pH
- Disinfect the effluent
- Neutralize or remove other chemicals or pollutants

Sludge or solids are generated during the treatment process and must be dried out, centrifuged, incinerated and/or landfilled. There are many permutations of the treatment process.

Three Areas of Water Treatment

Water Treatment is the process of collecting and treating water to be clean water for a community, and is generally split into three areas:

- Raw Water Collection
- Treatment
- Storage and Distribution

Raw Water Collection

Raw water collection includes:

- Reservoirs & Rivers
- Canals
- Deep Wells
- Water Transition Mains (Pipes)
- Lift stations

The components of a raw water collection system generally begin with a surface water source which can be a reservoir or a system of water wells. The raw water is then conveyed to a surface water treatment facility. In many cases pumps are used to draw water from the raw water source into a canal or water transition main that caries the water to the treatment plant.

When pumps are used, in many cases the pump operation is automated and uses a Supervisory Control and Data Acquisition system to control the water rate and volume being pumped to the treatment facility.

When wells are used as the water source the well facility would consist of a Well-Head pump and pump motor drawing water from some depth below ground and discharging into a pipe system.

Raw Water Treatment (1 of 2)

Drinking water sources are subject to contamination and require appropriate treatment to remove disease-causing agents. Public drinking water systems use various methods of water treatment to provide safe drinking water for their communities. Today, the most common steps in water treatment used by community water systems (mainly surface water treatment) include:

- Coagulation and Flocculation

- Coagulation and flocculation are often the first steps in water treatment. Chemicals with a positive charge are added to the water. The positive charge of these chemicals neutralizes the negative charge of dirt and other dissolved particles in the water. When this occurs, the particles bind with the chemicals and form larger particles, called floc.

- Sedimentation
  - During sedimentation, floc settles to the bottom of the water supply, due to its weight. This settling process is called sedimentation.

Potable Water

If something is potable that means it's safe to drink. In developed countries, tap water is usually potable. Potable can also be a noun, meaning any drinkable liquid.

Raw Water Treatment (2 of 2)

- Filtration
  - Once the floc has settled to the bottom of the water supply, the clear water on top will pass through filters of varying compositions (sand, gravel, and charcoal) and pore sizes, in order to remove dissolved particles, such as dust, parasites, bacteria, viruses, and chemicals.

- Disinfection
  - After the water has been filtered, a disinfectant (for example, chlorine, chloramine) may be added in order to kill any remaining parasites, bacteria, and viruses, and to protect the water from germs when it is piped to homes and businesses.

Water may be treated differently in different communities depending on the quality of the water that enters the treatment plant. Typically, surface water requires more treatment and filtration than ground water because lakes, rivers, and streams contain more sediment and pollutants and are more likely to be contaminated than ground water.

Water Storage and Distribution System (1 of 2)

In many cases the water distribution system starts at the end of the water treatment facility with a series of booster pumps used to pump the treated water into the water storage and distribution system.

The water storage and distribution system is made up of major transition mains that convey bulk treated water to the distant regions of the distribution system or into ground storage or elevated storage tanks. These tanks vary in size depending on the peak demands for water in that area. These tanks are holding reservoirs that feed the distribution system that supplies water to the consumers.

The elevated storage tanks rely on the height of the storage tank to provide the water pressure in the distribution system while the ground storage tank typically use booster pumps to feed the water into the water distribution system. The tanks are equipped with water level sensors and overflow sensors.

Water Storage and Distribution System (2 of 2)

The water distribution system itself may have booster pumps or pressure regulating valves strategically placed within the distribution system to provide the required water pressure throughout the system to meet the needs of the consumers. In areas of low water pressure, booster pumps can be used to raise the water pressure while in areas where there is excessively high-water pressure, pressure regulating valves or pressure reducing valves are used.

One of the critical aspects of the water distribution system is during fire. The water system provides the water required to fight fires through the fire hydrants located throughout the distribution system. Fire service lines are connected to the water distribution system specifically for the purpose of providing water to the public and private facilities for the purpose of fire suppression.

Lesson 1 Summary

This lesson is complete.

Participants can now:

- Describe the different components of water and wastewater treatment systems
- Identify types of water and wastewater treatment facilities and distribution networks

The next lesson will provide an overview of the eligibility requirements for water and wastewater treatment systems.

Select this link to access a full image description.

Lesson 2 Overview

This lesson is an overview of the eligibility requirements for water and wastewater treatment systems. It will identify common reasons why water and wastewater treatment systems projects are deemed ineligible.

At the end of this lesson, participants will be able to:

- Identify the eligibility requirements for water and wastewater systems
- Identify common reasons why water and wastewater treatment system projects are deemed ineligible for Public Assistance Program funding

Select this link to access a full image description.

Components of Eligibility (1 of 2)

The four basic components of eligibility are:

- Applicant
- Facility
- Work
- Cost

FEMA refers to these components as the building blocks of an eligibility pyramid. Generally, FEMA must determine each building block eligible, starting at the foundation (Applicant) and working up to cost at the top of the pyramid.

Components of Eligibility (2 of 2)

There are two exceptions to the standard eligibility pyramid. For Private Nonprofits, FEMA must determine whether the Private Nonprofit owns or operates an eligible facility in order to determine whether the Applicant is eligible.

Secondly, for State, Territorial, Tribal, and local government Applicants, evaluating facility eligibility is not a necessary step for most Emergency Work.

Eligible Applicants

FEMA aids eligible Applicants. FEMA must first determine whether an Applicant is eligible before evaluating the Applicant's claim.

The following are a list of eligible Applicants:

- State and Territorial Governments
- Tribal Governments
- Local Governments
- Private Nonprofit Organizations

State and Territorial Governments

Examples of State and Territorial governments that are eligible Applicants include:

- District of Columbia
- American Samoa
- The Commonwealth of the Northern Mariana Islands
- Guam
- Puerto Rico
- U.S. Virgin Islands

Tribal Governments

Federally recognized Tribal governments, including Alaska Native Villages and organizations (hereinafter referred to as "Tribal governments"), are eligible Applicants.

Alaska Native Corporations are not eligible as they are privately owned.

Local Governments

The following types of local governments are eligible Applicants:

- Counties and parishes
- Municipalities, cities, towns, boroughs, and townships
- Local public authorities
- School districts
- Intrastate districts
- Councils of governments (regardless of whether incorporated as nonprofit corporations under State law)
- Regional and interstate government entities
- Agencies or instrumentalities of local governments
- State-recognized Tribes
- Special districts established under State law
- Community Development Districts
    - To be eligible, a Community Development District must be legally responsible for ownership, maintenance, and operation of an eligible facility that is accessible to the general public.

Private Nonprofit Organizations

Only certain Private Nonprofit Organizations are eligible Applicants. To be an eligible Private Nonprofit Applicant, the Private Nonprofit must show that it has:

1. A current ruling letter from the U.S. Internal Revenue Service granting tax exemption under sections 501(c), (d), or (e) of the Internal Revenue Code of 1954; or
2. Documentation from the State substantiating it is a non-revenue producing, nonprofit entity organized or doing business under State law.

Eligible Facilities (1 of 2)

In general, a facility must be determined eligible in order for work to be eligible. There are exceptions for some Emergency Work activities.

A facility is a building, works, system, or equipment, built or manufactured, or an improved and maintained natural feature.

An example of a system that qualifies as a facility is a water distribution system. Mechanical, electrical, plumbing, and other systems that are components of a facility in which they operate are considered part of that facility.

Eligible Facilities (2 of 2)

A natural feature is improved and maintained if it meets all of the following conditions:

- The natural feature has a designed and constructed improvement to its natural characteristics, such as a terraced slope or realigned channel
- The constructed improvement enhances the function of the unimproved natural feature
- The Applicant maintains the improvement on a regular schedule to ensure that the improvement performs as designed

Eligible Public Facilities

An eligible public facility is one that a State, Territorial, Tribal, or local government owns or has legal responsibility for maintaining. Including any:

- Flood control, navigation, irrigation, reclamation, public power, sewage treatment and collection, water supply and distribution, watershed development, or airport facility
- Non-Federal-aid street, road, or highway
- Other public building, structure, or system, including those used for educational, recreational, or cultural purposes

Private Nonprofit Facility

An eligible Private Nonprofit facility is one that provides educational, utility, emergency, medical, or custodial care, including for the aged or disabled, and other essential governmental-type services to the general public.

If a Private Nonprofit operates multiple facilities, or a single facility composed of more than one building, FEMA must evaluate each building independently, even if all are located on the same grounds. Buildings that are part of a complex that includes outdoor facilities (e.g., swimming pools, athletic fields, tennis courts) are not evaluated separately from the rest of the complex when determining eligibility of the building.

For example, an outdoor pool usually has a building for bathrooms and controlling entry. In such cases, FEMA does not evaluate the building for eligibility separately because it is an intrinsic part of the pool complex.

Ineligible Facilities

The following are examples of ineligible facilities:

- Unimproved property (e.g., a hillside or slope, forest, natural channel bank)
- Land used for agricultural purposes

General Work Eligibility

Through the Public Assistance program, FEMA provides:

- Grant funding for Emergency Protective Measures and debris removal (Emergency Work)
- Grant funding for permanent restoration of damaged facilities, including cost-effective hazard mitigation to protect the facilities from future damage (Permanent Work)

Categories of Work

To facilitate the processing of Public Assistance funding, FEMA separates Emergency Work into two categories and Permanent Work into five categories based on general types of facilities.

These categories and examples of each are shown in the figure: (Emergency work and Permanent Work)

Select this link for a full image description.

Minimum Work Eligibility Criteria

At a minimum, work must meet each of the following three general criteria to be eligible:

- Be required as a result of the declared incident;
- Be located within the designated area, with the exception of sheltering and evacuation activities; and
- Be the legal responsibility of an eligible Applicant.

Mutual Aid Eligibility

In emergency services, mutual aid is an agreement among emergency responders to lend assistance across jurisdictional boundaries. This may occur due to an emergency response that exceeds local resources, such as a disaster or a multiple-alarm fire.

Three types of mutual aid are eligible:

- Emergency Work
- Emergency utility restoration (regardless of whether it is deemed Category B or F)
- Grant management

Mutual Aid work is subject to the same eligibility criteria as contract work.

Costs to transport the providing Entity's equipment and personnel to the declared area are eligible.

Cost Eligibility

The final component evaluated for eligibility are the costs claimed by the Applicant. Not all costs incurred as a result of the incident are eligible.

To be eligible, costs must be:

- Directly tied to the performance of eligible work
- Adequately documented
- Reduced by all applicable credits, such as insurance proceeds and salvage values
- Authorized and not prohibited under Federal, State, Territorial, Tribal, or local government laws or regulations
- Consistent with the Applicant's internal policies, regulations, and procedures that apply uniformly to both Federal awards and other activities of the Applicant
- Necessary and reasonable to accomplish the work properly and efficiently

A cost is reasonable if, in its nature and amount, it does not exceed that which would be incurred by a prudent person under the circumstances prevailing at the time the Applicant makes the decision to incur the cost.

Lesson Summary

This lesson is complete.

Participants can now:

- Identify the eligibility requirements for water and wastewater systems.
- Identify common reasons why water and wastewater treatment system projects are deemed ineligible for Public Assistance Program funding.

The next lesson provides the processes involved in documenting disaster-related damage to water and wastewater treatment systems

Select this link to access a full image description.

Lesson 3 Overview

This lesson is an overview of the eligibility requirements for water and wastewater treatment systems. It will identify common reasons why water and wastewater treatment systems projects are deemed ineligible.

At the end of this lesson, participants will be able to:

- Identify the eligibility requirements for water and wastewater systems
- Identify common reasons why water and wastewater treatment system projects are deemed ineligible for Public Assistance Program funding

Select this link to access a full image description.

Identifying Pre-Disaster Conditions for FEMA

To document the pre-disaster condition of a water or wastewater system, the Applicant should provide the following information:

- A signed, dated, and stamped letter from a licensed professional engineer who has direct experience with the damaged water or wastewater system certifying the pre-disaster capacity and condition of the system along with records providing satisfactory evidence of the pre-disaster capacity and condition of the system
- Records including but not limited to:
    - Maintenance records
    - Contract documents
    - Work orders
    - Inspection logs
    - Description of past inspection and maintenance activities certified by a licensed professional engineer

- If available, copies of construction work plans demonstrating the utility's past practices and current and future projects

If the Applicant can provide the information above, FEMA does not require further documentation to establish pre-disaster condition. The Applicant is not precluded from substantiating the pre-disaster condition with other documentation if it is unable to provide the documentation described above.

Documentation

The Applicant is responsible for providing documentation to demonstrate their claimed costs are reasonable. All volunteer hours, equipment, and materials must be documented.

The following are examples for how a person would document costs claimed.

For Individuals:

- Name
- Days and hours worked
- Location of work and work performed

Equipment:

- Same information listed under Applicant Owned Equipment above
- Who donated each piece of equipment

Supplies or materials:

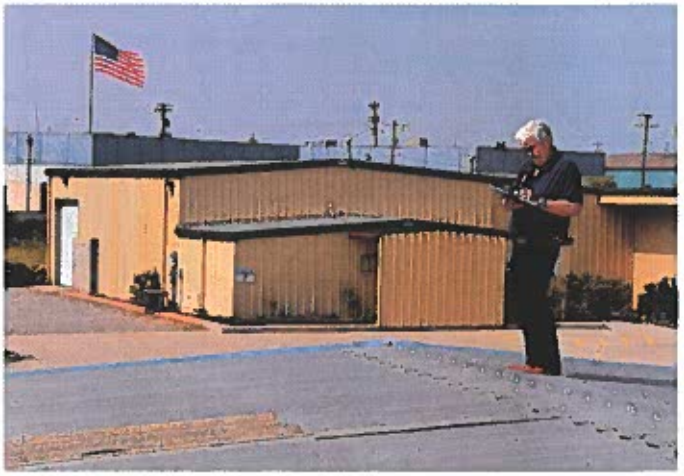
- Quantity donated
- Who donated
- Location(s)
- Use

Questions the Applicant Should Document

There are several categories and lists of questions the Applicant should review, prior to the reimbursement request.

Below are questions the Applicant should document regarding facilities:

1. Was the facility damaged as a direct result of the disaster?
2. Was the facility regularly maintained?
3. Prior to the disaster, was the facility under construction or scheduled for repair/replacement?
4. What type of facility was damaged? (i.e. Water/Wastewater Treatment, Water Storage, Communications)
5. Do the assigned damages have insurance?



Damage Considerations

The following are components to consider when a Water/Wastewater Treatment, Collection, and

Delivery facility has been damaged.

Were the damaged components:

- Pipes
- Tanks
- Intake systems
- Primary sedimentation
- Chlorination systems
- Filters
- Generators
- Pumps
- Fences

Documenting Damage for Reimbursable Expenses and Labor Eligibility (1 of 2)

The FEMA Program Delivery Manager is responsible for asking the Applicant questions. In responses of yes to specific questions below, the FEMA Program Delivery Manager is required to complete a fillable field narrative for each under the area that states, "Please describe the damage to the components".

The questions below are in the Grants Portal which generate the request for documents in the Essential Elements of Information. Questions include:

1. Does the Applicant have the legal responsibility to perform this work?

2. Are the damages in the designated disaster area?

3. Was the facility damaged as a direct result of the disaster?

4. Was the facility regularly maintained?

5. Prior to the disaster, was the facility under construction or scheduled for repair/replacement?

6. Water/Wastewater Treatment, Collection, and Delivery?

7. Pipes? Please describe the damage to the components.

8. Tanks? Please describe the damage to the components.

9. Intake Systems? Please describe the damage to the components.

10. Primary Sedimentation? Please describe the damage to the components.

11. Chlorination Systems? Please describe the damage to the components.

12. Aeration Tanks? Please describe the damage to the components.

13. Clarifiers? Please describe the damage to the components.

Documenting Damage for Reimbursable Expenses and Labor Eligibility (2 of 2)

Essential Elements of Information questions continued:

14. Filters? Please describe the damage to the components.

15. Effluent Outfalls? Please describe the damage to the components.

16. Controls/Sensors/Gauges? Please describe the damage to the components.

17. Generators? Please describe the damage to the components.

18. Pumps? Please describe the damage to the components.

19. Electrical Conduits? Please describe the damage to the components.

20. Buildings? Please describe the damage to the components.

21. Roads? Please describe the damage to the components.

22. Fences? Please describe the damage to the components.

23. Other? Please describe the damage to the components.

24. Water Storage and Delivery?

25. Pumps? Please describe the damage to the components.

26. Pipes? Please describe the damage to the components.

27. Tanks? Please describe the damage to the components.

28. Other? Please describe the damage to the components.

29. Do the assigned damages have insurance?

Secondly, the Applicant should know if the work was performed by:

- Applicant's own employees
- Contract
- Labor through mutual aid agreement
- Was Force Account Equipment used to perform the work
- Were Force Account Materials used to perform the work

Considerations for Percentage of Work Complete

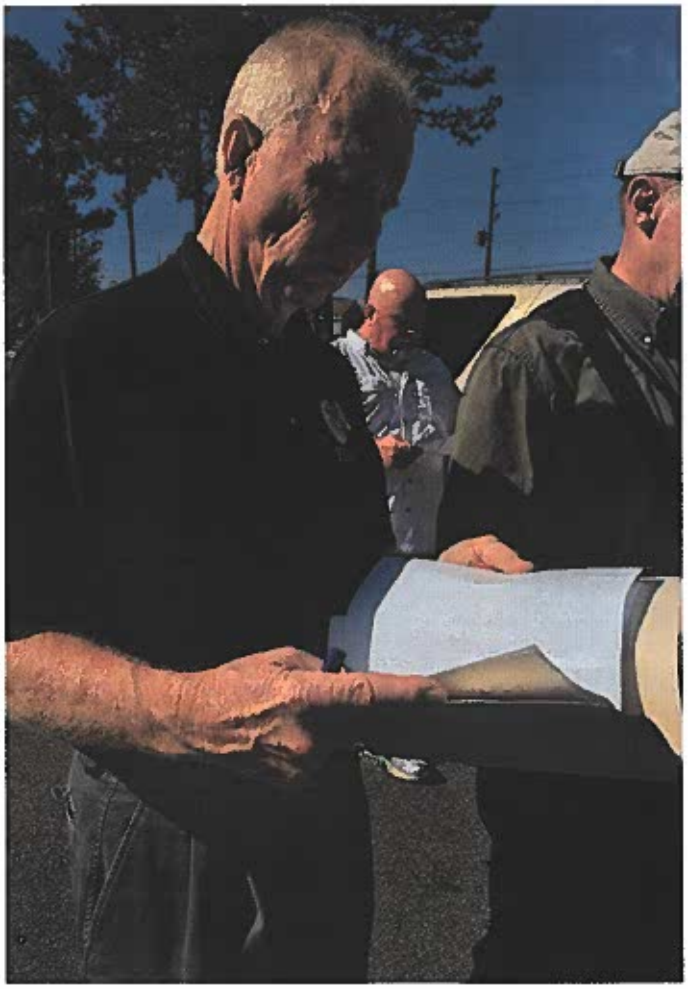
For work that is 100% complete, it's the Applicant's responsibility to demonstrate the damage existed, as a result of the declared event, through photos and supporting documents. Applicants are required to submit a complete document disclosure of work performed.

For work to be completed {work less than 100% complete}, Applicant's will

be asked to provide maintenance records, and a site inspection will be performed.

During the site inspection, A FEMA site inspector will complete a site inspection report, take photos, and create maps and sketches to document the site.

Site Inspection Considerations for Applicants



Applicant Roles:

- Must be present at all Site Inspections
    - It is crucial to be present always
- Identifies all site damage and components
- Answers Special Considerations Questions
- Signs the Site Inspection Report

At the time of site inspection, the Applicant will:

- Meet with the Site Inspector
- Review the Work Order together
- Plan a time effective strategy/plan to see sites
- Facilitate inspections of the designated sites on the Work Order

Site Inspection Considerations for Recipients

- Openly invited to attend FEMA site inspections
- May assist either FEMA or the Applicant by:
  - Asking questions
  - Taking measurements
  - Obtaining site photos
  - Drawing site sketches

FEMA Site Inspector Role

FEMA Site Inspectors are NOT there to:

- Self-identify damages
- Proceed to damaged sites alone
- Determine and/or discuss FEMA eligibility

Beyond FEMA Requirements and Special Considerations

Beyond FEMA requirements for documentation and compliance, the Recipient may require additional information.

Applicants are encouraged to communicate with their Recipient counterparts to determine and organize Grant Recipient compliance needs.

Additionally, In the development of Project Grants, the Applicant will be asked a series of Special Considerations questions. This will include consideration for work within or near waterways. If work is required within of near waterways

(within 200 ft.), the Applicant will be advised by the Recipient and FEMA on documentation and permitting needs to demonstrate compliance.

Duplication of Benefits

Duplication of Benefits is funding received from two sources for the same item of work.

FEMA is legally prohibited from duplicating benefits from other sources. If the Applicant receives funding from another source for the same work that FEMA funded, FEMA reduces the eligible cost or de-obligates funding to prevent a duplication of benefits

If the Applicant receives funds from another Federal agency for the same purpose as Public Assistance funding, it is a duplication of benefits. FEMA cannot duplicate funds provided by another Federal agency.

For additional information regarding duplication of benefits, refer to the Public Assistance Program and Policy Guide.

Lesson 3 Summary

This lesson is complete.

Participants can now:

- Identify proper procedures for documenting pre-disaster and disaster-related damage for expense reimbursement.

The next lesson focuses on the regulations and standards governing the repair, replacement, and rebuilding of water and wastewater treatment systems.

Select this link to access a full image description.

Lesson 4 Overview

This Lesson provides an overview of the regulations and standards governing the repair, replacement, and rebuilding of water and wastewater treatment systems, including Federal and State requirements, environmental and historic preservation concerns, and mitigation measures.

At the end of this Lesson, participants will be able to:

- Describe how water and wastewater systems regulations and standards apply to FEMA reimbursement program.

Select this link for a full image description.

Federal Requirements - National Electric Safety Code

The National Electric Safety Code is a United States standard of the safe installation, operation and maintenance of electric power and communication utility systems including power substations, power and communication overhead lines and power and communication underground lines. It is published by the institute of Electrical and Electronics Engineers.

Environmental Protection Agency guidelines

The Applicant is responsible for obtaining all required environmental and historic preservation permits from the appropriate agencies before proceeding with Emergency Work.

The Applicant should make every effort to inform the Recipient and FEMA of necessary Emergency Work prior to performing the work, when appropriate, to afford FEMA the opportunity to perform environmental and historic preservation reviews prior to the start of work.

The National Environmental Policy Act

The National Environmental Policy Act is a United States environmental law that promotes the enhancement of the environment and established the President's Council on Environmental Quality. The law was enacted on January 1, 1970. As the bill was an early step towards the development of the United States Environmental Policy, National Environmental Policy Act is referred to as the "Environmental Magna Carta".

However, FEMA must ensure compliance with other Federal environmental and historic preservation laws, regulations, and Executive Orders, including those related to floodplains, wetlands, federally listed threatened and endangered species and their critical habitats, and historic properties. Most environmental and historic preservation laws contain emergency provisions to expedite response activities that must be taken to prevent imminent loss of human life or damage to improved property.

Emergency Work and Considerations

When performing Emergency Work, the Applicant should avoid new ground disturbance when possible. If the Applicant cannot avoid new ground disturbance, it must consider impacts to natural and cultural resources and obtain all necessary permits.

An Applicant should be cognizant that State requirements for completing work may be more stringent than Federal requirements. Local requirements may be more stringent than State and Federal requirements. Applicants will be required to show compliance.

While there are many circumstances to consider, Applicants must ensure they comply with local, state, and Federal procurement policy in accordance with 2 CFR Part 200. Applicants will be required demonstrate the compliance and this specifically applies to the procurement of contracts, materials, and equipment.

Special Considerations (1 of 2)

Special Considerations include: Insurance, Mitigation, and Environmental and Historic Preservation considerations. Considerations are dependent on what was damaged during the event and what requires focus. For instance: if it's the sludge, wastewater treatment facilities, disinfection, etc.

Some special requirements could cover:

- Engineering Reports and Facility Plans
- Engineering Plans and Specifications
- Design of sewers
    - Approval of sewers
    - Design capacity and design flow
    - Details of design and construction
    - Manholes
    - Inverted siphons
    - Sewers in relation to streams
    - Aerial crossings
    - Protection of water supplies
- Wastewater pumping stations

- Design
- Suction-Lift Pump stations
- Submersible Pump stations
- Screw Pump stations
- Alarm systems
- Emergency operations
- Force mains

- Wastewater treatment facilities
  - Plant location
  - Quality of effluent
  - Design
  - Plant outfalls
  - Essential facilities
  - Laboratory

Special Considerations (2 of 2)

Special requirements continued:

- Screening, Grit Removal and Flow Equalization
  - Screening Devices
  - Comminutors
  - Grit Removal Facilities
  - Preaeration
  - Flow Equalization
- Settling
  - Design considerations
  - Sludge and scum removal
- Sludge processing, storage, and disposal
  - Process selection
  - Sludge thickeners
  - Anaerobic sludge digestion
  - Aerobic sludge digestion
  - High pH stabilization
  - Sludge pumps and piping
  - Sludge dewatering
  - Sludge storage and disposal
- Biological treatment
  - Trickling filters
  - Activated sludge
  - Wastewater treatment ponds
- Disinfection
  - Chlorine disinfection
  - Dechlorination
  - Ultraviolet disinfection
  - Ozone disinfection
- Supplemental treatment processes
  - Phosphorus removal by chemical treatment
  - High rate effluent filtration

- Handling and treatment of septage

Department of Environmental Conservation

Each State's Department of Environmental Conservation will have its own regulation policy and procedures requirements. Topics usually cover:

- Drinking water and ground water protection
    - Underground injection control
    - Groundwater protection rule and strategy
    - Indirect discharge rules
    - Well driller licensing rules
- Facilities Engineering
    - Unsafe dam revolving loan fund rules
- Watershed Management
    - Water pollution control permit regulations
    - Wasteload allocation process rule
    - Stormwater management
    - Stream alteration rule
    - Flood hazard area & river corridor rule
    - Water quality standards
    - Rules for determining mean water level for lakes and ponds
    - Surface level rules
    - Combined sewer overflow rules
- Air Quality and Climate
    - Regional greenhouse gas rule
- Waste Management & Prevention
    - Solid Waste management rules
    - Hazardous waste management regulations
    - Underground storage tank regulations
    - Aboveground storage tank regulations
    - Deposits for beverage containers
    - Salvage yards
    - Natural Resource damage assessment and restoration rule

Environmental and Historic Preservation

The Applicant is responsible for obtaining all required environmental and historic preservation permits from the appropriate agencies before proceeding with Emergency Work. The Applicant should make every effort to inform the Recipient and FEMA of necessary Emergency Work prior to performing the work, when appropriate, to afford FEMA the opportunity to perform environmental and historic preservation reviews prior to the start of work. Emergency Work is excluded from National Environmental Policy Act review through a statutory exclusion.

However, FEMA must ensure compliance with other Federal environmental and historic preservation laws, regulations, and Executive Orders, including those related to floodplains, wetlands, federally listed threatened and endangered species and their critical habitats, and historic properties. Most environmental and historic preservation laws contain emergency provisions to expedite response activities that must be taken to prevent imminent loss of human life or damage to improved property.

FEMA will consult with State Agencies as appropriate (State Historic Preservation Officer)

For more information refer to the Public Assistance Program and Policy Guide.

Environmental and Historic Preservation Compliance Considerations

FEMA must ensure that the Applicant's debris removal operations avoid impacts to floodplains, wetlands, federally listed threatened and endangered species and their critical habitats, and historic properties (including maritime or underwater archaeological resources if waterways are impacted).

The Applicant must stage debris at a safe distance from property boundaries, surface water, wetlands, structures, wells, and septic tanks with leach fields.

For more information refer to the Public Assistance Program and Policy Guide.

Mitigation

Mitigation is any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects.

In order for mitigation to be effective we need to take action now, before the next disaster, to reduce human and financial consequences later (analyzing risk, reducing risk, and insuring against risk).

It is important to know that disasters can happen at any time and any place and if we are not prepared, consequences can be fatal.

Effective mitigation requires that we all understand local risks, address the hard choices, and invest in long-term community well-being. Without mitigation actions, we jeopardize our safety, financial security and self-reliance.

FEMA's mitigation programs help reduce the impact of events-and our dependence on taxpayers and the Treasury for disaster relief.

Stafford Act Section 406

FEMA commonly refers to Public Assistance funded hazard mitigation as Section 406 hazard mitigation and mitigation funded under Hazard Mitigation program as Section 404 Hazard Mitigation. These references are based on the authorizing sections of the Robert T. Stafford Act.

FEMA evaluates proposed mitigation measures for cost-effectiveness, technical feasibility, and compliance with environmental and historic preservation laws, regulations, and Executive Orders. In addition, FEMA ensures that the mitigation does not negatively impact the facility's operation or surrounding areas, or create susceptibility to damage from another hazard.

Mitigation measures must be cost-effective. FEMA considers mitigation measures to be cost- effective if any of the following criteria are met:

- The cost for the mitigation measure does not exceed 15 percent of the total eligible repair cost (prior to any insurance reductions) of the facility or facilities for which the mitigation measure applies
- The mitigation measure is specifically listed in Appendix J: Cost-Effective Hazard Mitigation Measures, AND the cost of the mitigation measure does not exceed 100 percent of the eligible repair cost (prior to any insurance reductions) of the facility or facilities for which the mitigation measure applies
- The Recipient or Applicant demonstrates through an acceptable benefit-cost analysis methodology that the measure is cost-effective. FEMA's benefit-cost analysis software255 provides appropriate benefit-cost analysis methodologies.

Criteria for Approving Mitigation Measures

The following are criteria for approving mitigation measures:

- Technically feasible
- Address the type of event
- Cost-effective - The three criteria for determining cost-effectiveness include:

    - 15% of the total eligible repair cost (prior to any insurance reductions) of the facility(s)
    - 100% of the eligible repair cost (prior to any insurance reductions) of the facility(s) if it is on the FEMA pre-approved list:
        - Looped distribution service and other redundancies
        - Surge suppressors and lighting arrestors
        - Transformers
        - Power Poles
- FEMA's benefit-cost analysis requirements

For more information, refer to the Public Assistance Program and Policy Guide.

FEMA's Benefit-Cost Analysis Requirements

Benefit-cost Analysis is the method by which the future benefits of a hazard mitigation project are determined and compared to its costs.

A Benefit-Cost Analysis is based on a comparison of the total eligible cost for the mitigation measure to the total value of expected benefits.

Benefits include reduction in:

- Damage to the facility and its contents
- Need for emergency protective measures
- Need for temporary facilities
- Loss of function
- Casualties (typically only for earthquake, tornado, and wildfire mitigation)

The result is a Benefit-Cost Ratio, which is calculated by a project's total benefits divided by its total costs.

The Benefit-Cost Ratio is a numerical expression of the "cost-effectiveness" of a project. A project is cost effective when the Benefit-Cost Ratio is 1.0 or greater, indicating the benefits of a prospective hazard mitigation project are sufficient to justify the costs.

For more information, refer to the Public Assistance Program and Policy Guide.

Lesson 4 Summary

This Lesson is complete.

Participants can now:

- Describe how water and wastewater systems regulations and standards apply to FEMA reimbursement program

The next Lesson is a summary of the course.

Select this link to access a full image description.

Lesson 5 Overview and Objectives

This lesson will review the course objectives. Participants will take a Post-Course Assessment at its conclusion.
At the end of this lesson, participants will be able to summarize course objectives and overall course content.

Select this link to access a full image description.

Lesson 1 Objectives

Lesson 1: Overview provided an overview of water and wastewater treatment systems, including examples of water and wastewater treatment systems, facilities, and distribution networks.

Participants can now:

- State the goals and objectives of the course
- Describe the different components of water and wastewater treatment systems
- Identify types of water and wastewater treatment facilities and distribution networks
- Provide examples of water and wastewater treatment systems components
- Provide examples of water and wastewater facilities and distribution networks

Lesson 2 Objectives

Lesson 2: Water and Wastewater Treatment Systems Eligibility Requirements provided an overview of the eligibility requirements for water and wastewater treatment systems. It identified common reasons why water and wastewater treatment systems projects are deemed ineligible.

Participants can now:

- Identify the eligibility requirements for water and wastewater systems
- Identify common reasons why water and wastewater treatment system projects are deemed ineligible for Public Assistance Program funding
- Categorize eligible Applicants
- Recognize eligible facilities
- Categorize eligible work
- List frequent reasons why projects are deemed ineligible

Lesson 3 Objectives

Lesson 3: Documenting Disaster-Related Damage for Water and Wastewater Treatment Systems provided an overview of the processes involved in documenting disaster-related damage to water and wastewater treatment systems. This included records of pre-disaster condition, Emergency Work, mutual aid, and Permanent Work.

This lesson also explained rules preventing duplication of benefits.

Participants can now:

- Identify proper procedures for documenting pre-disaster and disaster-related damage for expense reimbursement
- Identify pre-disaster conditions for FEMA
- Document damage for reimbursable expenses and labor eligibility

Lesson 4 Objectives

Lesson 4: Regulations and Standards Governing the Repair, Replacement, and Rebuilding of Water and Wastewater Treatment Systems focused on the regulations and standards governing the repair, replacement, and rebuilding of water and wastewater treatment systems. This included Federal and State

requirements, environmental and historic preservation concerns, and mitigation measures.

Participants can now:

- Describe how water and wastewater systems regulations and standards apply to FEMA reimbursement program
- List Federal water and wastewater regulations and standards
- List State water and wastewater regulations and standards
- Identify Environmental and historic preservation concerns
- Identify Water and wastewater systems mitigation measures
- Define mitigation
- Differentiate criteria for approving mitigation measures

Course Summary

This Course is complete. The goal of this course was to provide in-depth training in policy and process to Applicants and Recipients to bring clarity to the Public Assistance process, specifically regarding water and wastewater treatment system considerations.

Participants can now:

- Describe Public Assistance policy and guidance related to water and wastewater treatment systems
- Identify common reasons why water and wastewater treatment systems projects are deemed ineligible for Public Assistance grant funding
- Identify documentation considerations associated with water and wastewater treatment systems, including documenting damage prior to repair
- Identify special considerations for eligible water and wastewater treatment systems projects

Select this link to access a full image description.