710 – Site Management Measures

710.03 Concrete and Cementitious Washwater Management

Definition:

Note: This practice replaces the prior "Concrete Washout" Chapter 7 page 247.

Cementitious washwater management is the management of washwater that results from the cleaning of tools and equipment used in the delivery, mixing, handling and working of cementitious materials for the prevention of its discharge to the soil and water resources. Cementitious material has properties of cement such as high pH and can contain toxic metals. Cementitious material is often associated with concrete, mortar, plaster, stucco, grout and flowable fill.

Note: This practice does not cover the washout of the vehicle mixing drums/barrels since typically this activity takes place at the ready-mix plant which is covered under other permitting regulations.

Exhibit 710.03-A. A manufactured washwater containment with folded ramps and a well stabilized access pad area
Source: Town of Fishers Department of Public Works

Purpose:

Cementitious washwater management systems are implemented to reduce the discharge of pollutants that are associated with high pH liquids, washwater and associated solids. Cementitious washwater is highly alkaline (typically pH 11 to 12+) and often contain heavy metals that may leach into the soil and contaminate ground water or discharge into a water body or wetland which can elevate the pH and harm aquatic life. Managing washwater in designated containment systems reduces the impact of cementitious washwater on the environment.

Plastic Cementitious material: is often a combination of aggregate, water, and cement, and this forms a building material that can be molded or maneuvered into position or formed into the desired configuration.

The most important properties of plastic cementitious materials are workability and cohesiveness. Concrete as an example is in its plastic state as it is discharged from the ready-mix concrete truck.
Hardened cementitious materials: are relatively benign and considered clean fill and are not required to be deposited in washwater containments or solid waste dumpsters/containers for disposal.

Specifications:

Design Considerations:

Sizing Considerations:

- The storage volume of the containment structure for the washwater should correlate to the anticipated amount of plastic cementitious materials used for construction. It is recommended that SWP3s contain estimates of the washwater volume derived from the amount of cementitious material used and the anticipated amount of washwater volume. The anticipated volume of washwater should account for equipment and tool clean up required to construct the planned project to ensure the project has appropriate provisions for cementitious washwater management (refer to Exhibit 710.03-J data sheet).
- Estimating washwater volumes for ready mixed concrete delivery can be highly variable due to many factors such as weather, air temperature, product slump, temperature of concrete, length of time on truck, and number of chutes used.
    - One method to estimate washwater volume is to use 20 to 40 gallons per ready mixed truckload (20 to 40 gallons x total cubic yards/8 cubic yards per truckload = total estimated gallons washwater generated).
    - When concrete pump trucks are used allow for a minimum of 50 gallons of washwater per pump use.
- Estimating the amount of washwater volume from cementitious products other than ready mix concrete is quite variable. Estimates that utilize higher volumes may ensure adequate washwater capacity. Provisions for additional storage are recommended.
- Recommended minimum depth of containment structure shall be 1 foot.
- Containments with larger footprints allow for greater evaporation potential of the washwater.
- The system shall be designed, to the extent practical, to eliminate run-off and minimize precipitation from entering the washwater containment system. Covering of washwater containments when not in use is recommended to prevent overflow and this will help minimize the amount of cementitious fluid that requires management.

Location:

- Locate washwater containments at least 50 feet from any creeks, wetlands, ditches, karst features, or storm drains/manmade conveyance systems.
- To the extent practical, locate washwater containments in relatively flat areas that have established vegetative cover.
- Locate washwater containment structures in a manner not to receive run-off. A diversion may be necessary where run-off cannot be avoided.
- Locate in areas that provide easy access for vehicles and associated equipment that require the use of washwater containment facilities.
- Locate away from other construction traffic to reduce the potential for damage to the system.

Structure Specifications:

- Manufactured systems or disposable containments: Use the required materials or components according to the product specifications.
- Structure must be watertight.
- Must have the strength to resist failure or collapse for the duration of the project or use.
- Containment waterproof lining:
    - Commonly used lining: polyethylene sheeting that has a minimum thickness of 10 mil (0.254 mm or 0.01 inch).
    - Must be durable, resistant to washwater chemistry (high pH), weathering or deterioration for the anticipated length of use time and until the washwater can be removed for treatment, recycling or until the fluids can evaporate and solids harden.
    - Must be free of defects, holes, rips or tears.
    - Containment lining must be a single continuous sheet sufficient to adequately line the entire containment. Avoid the need for seaming or joining of sheets but where required joining of sheets shall be only be accomplished according to the manufacturer's specifications.

Site Management

- It is critical to complete installation of the system and have washwater containments/facilities locations operational prior to using plastic state cementitious materials. The responsible party must ensure that washwater containments are available at the site to provide appropriate containment for all cementitious washwater even when using ready mix suppliers with trucks equipped with washwater recycling systems.
- Discharge prevention:
    - Do not discharge washwater from equipment used to deliver, transfer, mix, or work with cement containing materials on to the ground/soil, storm drains, wetlands, creeks, streams, rivers, ditches, karst features, streets or manmade conveyances.
    - Do not discharge washwater to a failing/leaking or overflowing containments.
    - Do not discharge to a closed washwater containment.
    - Never discharge washwater into a storm sewer drainage system. These systems are typically connected to a natural conveyance system.
    - Run-off from a rainstorm or snowmelt should not carry wastes away from the washout location.
    - Washwater containments are recommended to be covered if there is a potential for precipitation events to cause overflows or discharges.
- When spillage or uncontained discharges are identified through site management, perform an investigation to identify the responsible party and require corrective action.
- Height of the washwater containment shall be appropriate for job site activity.
- All weather access for motorized machinery, where necessary, to minimize tracking (refer to Temporary Construction Ingress/Egress Pad (701.04).
- Install systems at strategic locations that are convenient, in close proximity to work areas and in sufficient number and size to accommodate the demand for washwater disposal. Typically, washwater facility locations need to be adaptable to site work activities and progress.
- Provisions are needed for small mortar operations:
    - Source of clean water for washing tools.
    - Capture of washwater and/or transfer to containment structure.

- Provisions are needed for on-site concrete batch plants:
  - Source of clean water for washing equipment.
  - Capture of washwater and/or transfer to containment structure.
  - Adequate containment volume.
- Containment management:
  - It is recommended that washwater containments be restricted to only cementitious washwater or slurry.
  - Do not dispose of hardened concrete or other hardened cement containing materials, trash or debris in washwater containments since typically these materials result in tearing or puncturing of the waterproof liners and also result in rapid filling of storage space.
  - Do not use washwater containments to dispose of excess concrete or residual ready-mixed loads since surplus plastic concrete can be safely deposited on the ground in small piles to harden. Do not dispose plastic state cement containing materials in water resources or stormwater conveyances.
  - Hardened concrete is classified as clean fill and is not considered solid waste that requires disposal at solid waste permitted facilities.
- Communication:
  - Install signage identifying the location of washwater containments/facilities and to discourage the disposal of other non-washwater related materials into washwater facilities.
  - Provide maximum fill level indicators to allow sufficient capacity in the containment to avoid overfilling or overflows. Typically, containments should not be filled beyond 75 percent of containment capacity and allow for additional storage if unprotected or not covered from precipitation.
  - Site management shall inform all contractors or users of plastic cementitious materials (concrete, mortar, plaster, stucco and grout) of their responsibility to dispose washwater into washwater containments and where they are located. The responsibility for maintenance and monitoring of washwater containment systems needs to be assigned by the site manager.
- Washwater treatments:
  - On-site treatments that chemically alter cementitious washwater for the purpose of discharging is not allowed without appropriate permitting.
  - Cementitious washwater treatments that dewater or solidifies liquids or slurries are allowable without additional permitting. Dispose of solidified cementitious materials according to the manufacture's requirements of the solidifying agent.
- Closure:
  - When a containment is at capacity and can no longer accept washwater, identify with "Closed" sign.
  - If the containment system is being removed from the site, no spillage of washwater shall occur from the transport of the unit.
  - Closure of washwater containments shall only be accomplished when all fluids are removed or evaporated. The remaining solid cementitious materials may be used as clean fill.

Measures for different containment systems:

Manufactured Washwater Containment Systems:

- Are containment systems that are delivered to a site.
- Manufacturer or supplier provides the containers. The project site manager maintains the system, or the supplier provides complete service that includes maintenance and disposal of contained fluids and solids.
- Units are often available with or without ramps. Units with ramps lend themselves to accommodate pump trucks and other types of equipment.
- Use and maintain according to the manufacturer's recommendations.

Modified Trash Dumpsters for Washwater Containment:

Trash dumpsters (roll-off boxes) modified to function as a washwater containment facility must meet the following criteria:

- Must be in good condition without interior rough edges or defects that will tear the waterproof liner.
- Height of the dumpster sides must be compatible with the plastic state cement containing work activities and equipment being used at the site.
- Waterproof lining must be wide enough and long enough to line the container with a single continuous sheet (without joining or seaming together of sheets) with a sufficient amount to lap/extend over the dumpster walls.
- Waterproof lining must be secured around the edge of the dumpster to prevent liner slippage into or below the containment pooling area (refer to Exhibit 710.03-B).

Disposable Washwater Containments:

Disposable containments are one time use units typically made of cardboard with plastic liners or waterproof geotextile bags or containers. Disposable containments are typically light, easy and fast to set up and ideal for small volume washwater activities.

- Disposable containments must be leakproof and sufficiently weather resistant to contain washwater fluids for the duration of the construction activity and/or until fluids can be removed for off-site disposal or until fluids can evaporate.
- When disposable containments are used site management must monitor and require timely removal of any accumulated fluids prior to overflow from use or precipitation.
- The component materials of the disposable container are not classified as clean fill and therefor require appropriate disposal. The dried contents (solids) can be separated from the container and lining and then used as clean fill.

On-Site Constructed Containment Units:

Above grade or below grade units are designed and constructed using on-site according to the plan detail. Below grade systems are to be used only when there is no other feasible way to implement containment. Below grade containments cannot be monitored for liner leakage therefor justification is required within the SWP3 for the use of below grade containments (refer to Exhibit 710.03-J item f. of data sheet).

- Waterproof lining must be wide enough and long enough to line the containment with a single continuous sheet with sufficient amount to lap over the top containment sides and provide enough length for securing to the structure.

- Containment linings must meet the requirements in the specifications section.
- A base shall be prepared that is free of rocks and other debris that may cause tears or punctures in the waterproof lining.
- Designed and built containments must be sized for the required washwater activities. When the containment becomes 75% full it needs to be replaced with a new constructed unit or have the fluids removed.

Above Grade System (refer to Exhibit 710.03-H)**:**

- The containment support wall for the waterproof lining may utilize wood walls (refer to Exhibit 710.03- D), straw bales (refer to Exhibit 710.03-H), tubular sediment control products (refer to Exhibit 710.03-E), sandbags, berms of sand or fine aggregate or other acceptable barriers that will maintain their shape and integrity.
- Earthen containment berms for above ground containments do not allow for adequate monitoring for liner failures or leakage.

Below Grade System: (refer to Exhibit 710.03-I)**:**

Below grade washwater containment systems are only to be used when there is no other feasible way to implement above grade containments such as for masonry mortar mixing station areas (refer to Exhibit 710.03-K). Below grade containments cannot be monitored for liner leakage therefor justification is required within the SWP3 for the use of below grade containments (refer to Exhibit 710.03-J data sheet).

- The waterproof lining should extend over the top of the excavation for anchoring. Use an anchoring system that uniformly holds the lining in place without tearing.
- No run-off shall be allowed to enter the containment pit. Divert run-off away from washwater containment area.
- Place flags, safety fencing, or equivalent to provide a barrier to construction equipment and other traffic.

Masonry Mortar Mixing Station Washwater Containment (refer to Exhibit 710.03-K)**:**
Washwater from cleaning tools or equipment and run-off from mortar or stucco operations is required to be contained to evaporate or to be properly disposed. Washwater cannot be discharged at a jobsite to the ground/soil, water resources, or conveyances.

Exhibit 710.03-K is an example of a method for capturing washwater and cement containing materials resulting from mortar mixing activities and from the rinsing of mortar handling equipment and tools. Please note that there are likely other possible ways to achieve washwater containment from masonry activities.

Ready Mixed Concrete Truck Chute cleaning concerns:

- Excess plastic concrete left in the chute after the pour should be scraped out and deposited into small piles on the ground (not in water resources or conveyances) and left to harden for removal, recycling into aggregate or used for clean fill.
- At the washwater containment location, using water clean the remaining concrete material into the containment.

- In general, do not spray off any part of the delivery truck at the job site unless the water can be collected or placed in a washwater containment system. Washwater resulting from washing of truck windows and mirrors does not require containment (safety requirement).
- Do not back wash equipment at the project site. Back washing should be restricted to the plant as it generates large volumes of waste that more than likely will exceed the capacity of most on-site washwater containment systems. If an emergency arises, back wash should only be performed with the permission of an on-site manager for the project.
- For small volume washwater activities use of disposable washwater containments or truck mounted washwater recycling systems are often the easiest or most applicable containment method.

Rinse Procedures for Trucks Equipped Washwater Recycling Systems (refer to Exhibit 710.03-C)**:**

1. Move truck to an appropriate location to rinse down.
2. Scrape excess plastic concrete from chute (without using water). Excess plastic concrete can be placed on the ground in small piles to harden for pickup, recycling into aggregate or used as clean fill.
3. Install recycling system bucket and attach hose to pump mounted on the truck.
4. Rinse down starting with the load hopper and then working down to the chutes.
5. Once hopper and chutes are clean thoroughly rinse down bucket ensuring all water containing cementitious materials is pumped back into the truck mixer barrel.
6. Once bucket is clean then the remaining aggregate can be placed on the ground, as fill or with other aggregate.
7. Replace and secure recycling system components on truck.
8. Do not spray off any part of the truck that cannot be collected in a washout containment or pumped back into the truck. Washwater resulting from washing of truck windows and mirrors does not require containment (safety requirement).

Rinse Procedures for Trucks Not Using Truck Mounted Washwater Reclaiming Systems:

1. Move truck to an appropriate location and scrape excess plastic concrete from chute (without using water). Excess plastic concrete can be placed on the ground in small piles to harden for pickup, recycling into aggregate or used as clean fill to scrape excess plastic concrete from chute.
2. Move truck to washwater containment and ensure that all washwater from hopper and chute rinsing will enter containment.
3. Rinse down starting with the load hopper and then working down to the chutes.
4. Do not spray off any part of the truck that cannot be collected in a washout containment. Washwater resulting from washing of truck windows and mirrors does not require containment (safety requirement).
5. Stop rinsing out in an area if you observe washwater running off the designated area or if the containment system is leaking or overflowing and ineffective.

Maintenance:

- Inspect daily as washout containments are being used and after each storm event.
- Inspect the system for leaks or spills. Discontinue use if units are overflowing or leaking. Immediately install “Closed” sign, cover and pump fluids to additional containments or remove from the site for proper disposal for treatment or reuse at the concrete plant.
- Maintain all weather access to the containment facility to minimize tracking.
- Inspect the waterproof lining for failure, including tears and punctures or slide down from containment structure walls.
- When containments reach 75 percent of capacity or according to containment fill level requirements, discontinue use with signage identifying “Closed”, and install or bring in additional containments prior to creating additional cementitious washwater.
- Recycling of material is encouraged. Reuse the material on site as clean fill, recycle, or haul the material to an approved construction/demolition landfill site.
- The waterproof liner typically cannot be reused and must be replaced after containment cleanout.
- Concrete washout systems are designed to promote evaporation. However, if the liquids do not evaporate and the system is near capacity it may be necessary to vacuum or remove the liquids and dispose of them in an acceptable method.
- When spillage or uncontained discharges are identified through site management, perform an investigation to identify the responsible party and require corrective action.
- When cementitious washwater systems are no longer required, the concrete washout systems shall be closed. Properly dispose of all hardened concrete, containers and other materials used to construct the system.
- Holes, depressions and other land disturbances associated with the system should be backfilled, graded, and stabilized. Where soil has been impacted by washwater deposits removal and replacement with topsoil may be required where landscaping is planned.

Exhibit 710.03-B. A trash dumpster has been lined with a black plastic liner to form a watertight containment for cementitious washwater. Notice the improvised clamps (sliced corrugated plastic drainage tubing) that hold the liner in place to prevent liner from sliding into the dumpster box and below the washwater and slurry pool elevation.
Source: IDEM

Exhibit 710.03-C. Concrete delivery vehicle using a truck mounted washwater recycling bucket that pumps the washwater from rinsing the hopper and chute back into the truck drum to return the washwater used for rinsing back to the plant for reuse or treatment. Washed aggregate can be placed on the ground or used as fill.
Source: IDEM

Exhibit 710.03-D. A constructed above grade wood supported washwater containment that is lined with polyethylene plastic liner.
Source: IDEM

Exhibit 710.03-E. A constructed above grade washwater containment using tubular sediment controls to support the polyethylene plastic lined containment. The waterproof liner is secured from slippage into the containment by being tucked under the sediment control tubes. The wooden stakes hold the stacked tubular containment wall in place. Containment is nearly water filled and requires fluid removal to prevent overtopping from the next precipitation event.
Source: IDEM

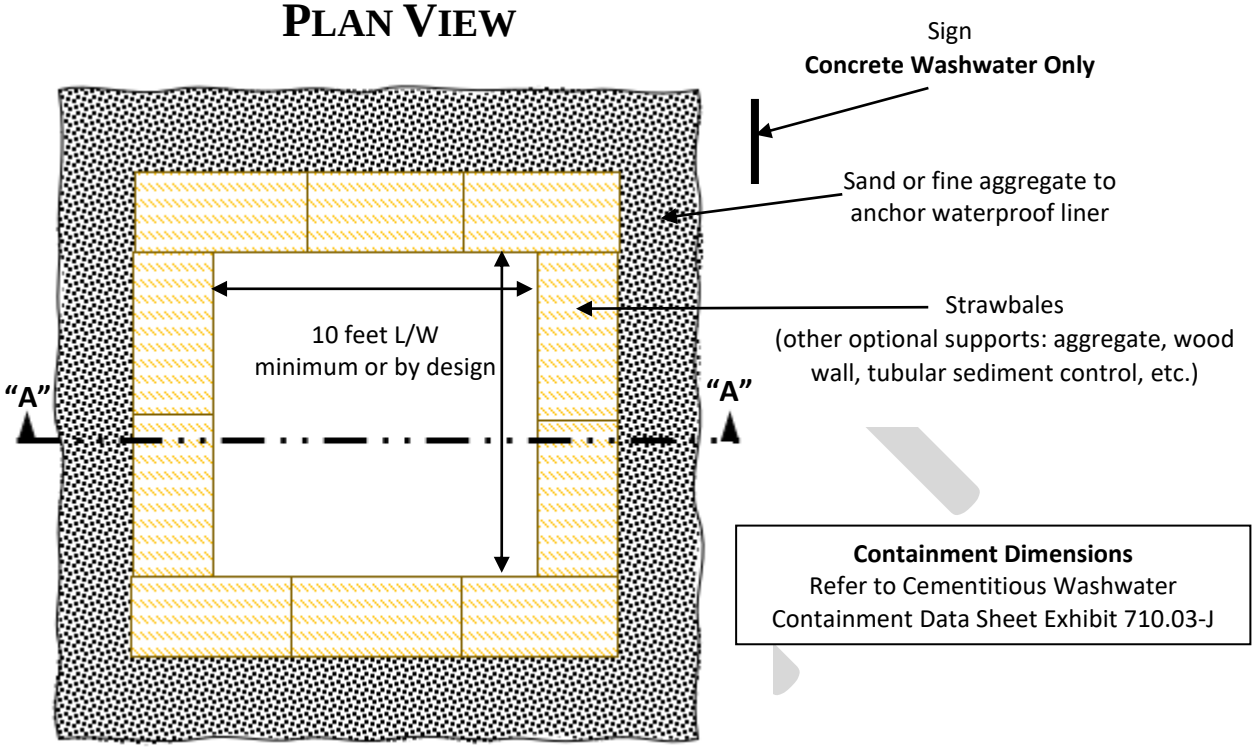
Exhibit 710.03-F. Uncontained/spilled cementitious fluids from mortar mixing and rinsing of handling equipment has occurred. Mortar mixing fluids and washwater from handling equipment/tubs do not have a containment system to prevent discharging of cement containing fluids.
Source: IDEM

Exhibit 710.03-G. A modified dumpster washwater containment is the appropriate height for site chute cleaning activities, well identified with signage and has a stabilized access area to minimize tracking from the site.
Source: IDEM

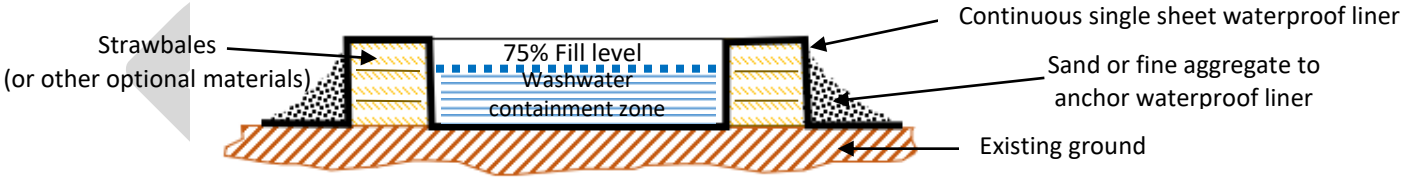
Exhibit 710.03-H

ABOVE GRADE CEMENTITIOUS WASHWATER CONTAINMENT
TYPICAL PRACTICE DIAGRAM
(NOT TO SCALE)

PLAN VIEW



CROSS SECTION "A"



Waterproof lining (options):

- Commonly used: polyethylene sheeting a minimum thickness: 10 mil (0.254 mm or 0.01 inch).
- Must be durable, resistant to washwater chemistry (high pH), weathering or deterioration for the anticipated length of use time and until the washwater can be removed for treatment or recycling or until the fluids can evaporate and harden.
- Must be free of defects, holes, rips or tears.
- Containment lining must be a single continuous sheet sufficient to adequately line the entire containment. Avoid the need for seaming or joining of sheets but where required joining of sheets shall be only be accomplished according to the manufacturer's requirements.

Note: The illustrations in this exhibit are not intended to serve as construction drawings. The diagrams are to be used to communicate the concepts for implementation of this control measure.

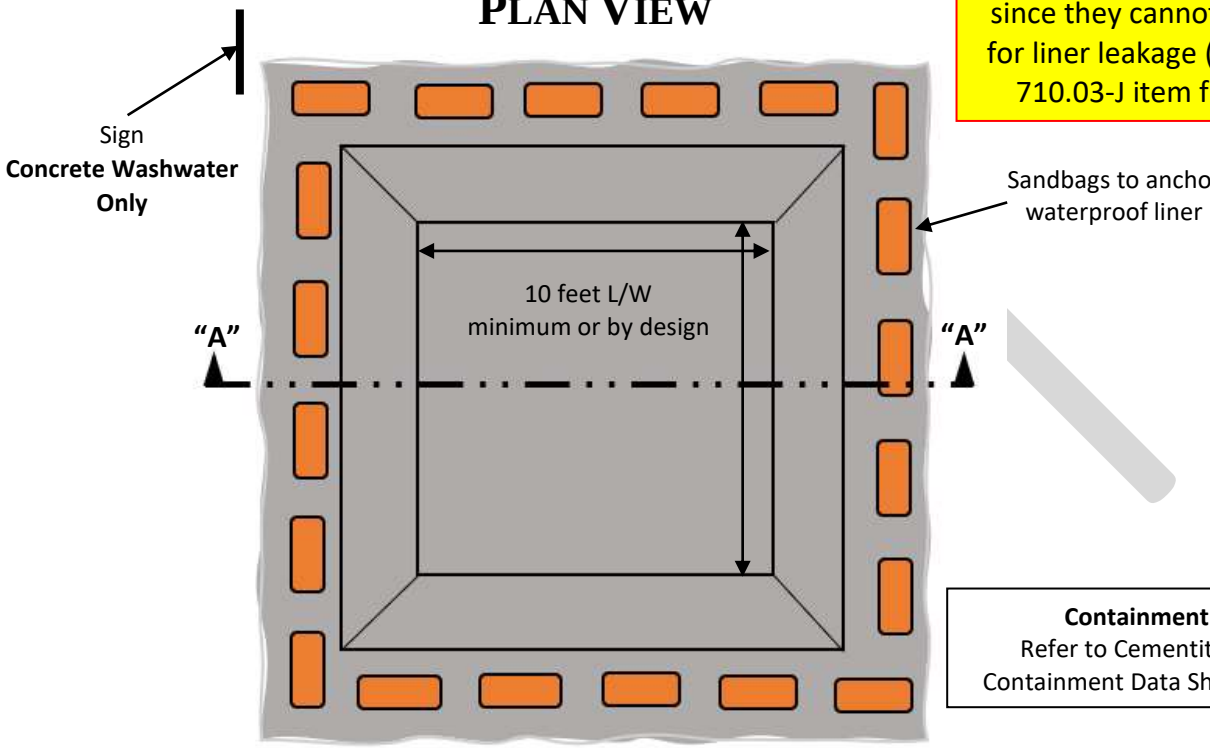
Source: IDEM file

Exhibit 710.03-I

BELOW GRADE CEMENTITIOUS WASHWATER CONTAINMENT
TYPICAL PRACTICE DIAGRAM
(NOT TO SCALE)

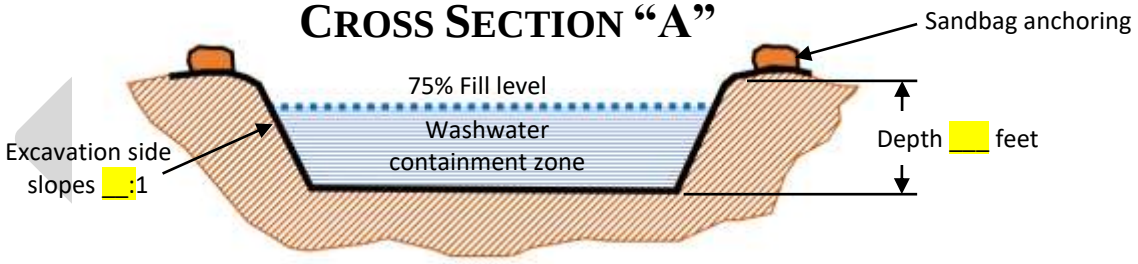
Notice: Justification is required for below grade containments since they cannot be monitored for liner leakage (refer to Exhibit 710.03-J item f. data sheet).

PLAN VIEW



Containment Dimensions
Refer to Cementitious Washwater Containment Data Sheet Exhibit 710.03-J

CROSS SECTION "A"



Waterproof lining (options):

- Commonly used: polyethylene sheeting a minimum thickness: 10 mil (0.254 mm or 0.01 inch).
- Must be durable, resistant to washwater chemistry (high pH), weathering or deterioration for the anticipated length of use time and until the washwater can be removed for treatment or recycling or until the fluids can evaporate and harden.
- Must be free of defects, holes, rips or tears.
- Containment lining must be a single continuous sheet sufficient to adequately line the entire containment.

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Source: IDEM

EXHIBIT 710.03-J

Washwater Containment Design Guidance

Computed by: _____ Date: _____

Project Name: _____

Washwater source: ☐ Concrete ☐ Mortar/masonry ☐ Grout ☐ Flowable fill ☐ Other _____

It is highly recommended that plans contain estimates for implementation of containments sufficient to receive the anticipated washwater volumes. Plans must provide sufficient information to construct or implement adequate containments. On-site constructed containments must have construction details, drawings and installation requirements and number of containment units, where necessary, to provide adequate containment of project cementitious washwater necessary to complete the project.

Narrative of cementitious washwater management:

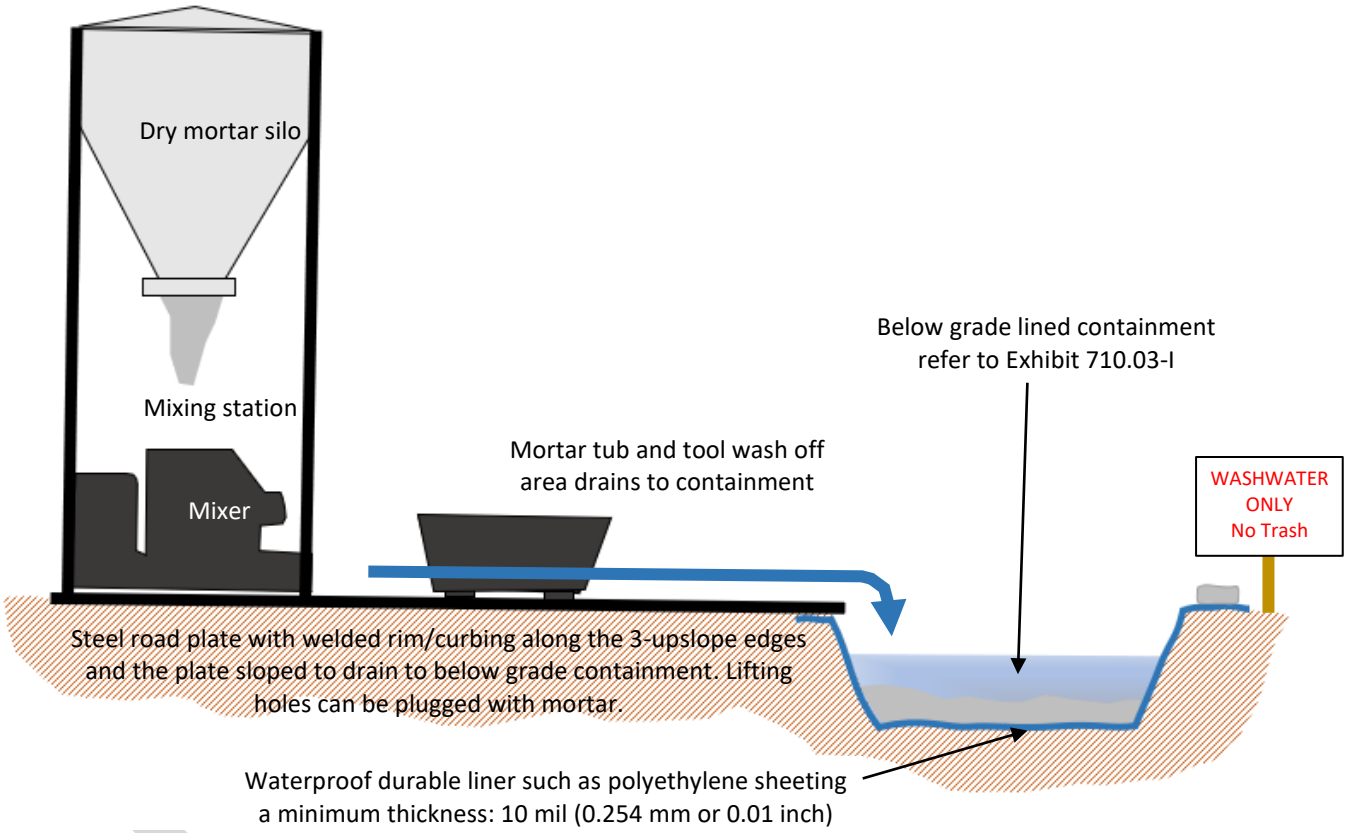
a. Anticipated washwater volume: _____
   _____
b. Description of containments including size and number (refer to SWP3).

The following are suggestions for deriving a washwater management plan.

1. Anticipated cubic yards of cementitious plastic state material: _____ cubic yards
   a. Anticipated washwater from ready mixed concrete trucks:
      i. Average load volume is estimated to be 8 cubic yards of concrete per truck.
      ii. Number of trucks _____ x 20-40 gallons = _____ total gallons
      iii. Total gallons ____ x 0.13 cubic feet/gallon x 1.25 (freeboard) = ____ cubic feet of washwater containment required with freeboard.
   b. Anticipated washwater from other cementitious activity _____cubic feet. (mortar/masonry, grout, on-site batch plant, other)
   c. For residential projects: washwater estimate per house/unit ____ cubic feet x ___ units = _____ total washwater volume to cover resident home construction.
2. Type of containment (not limited to one type):
   a. ☐ Ready mixed concrete with truck mounted washwater recycling systems.
   b. ☐ Manufactured unit:
      i. Size: Length: ____ feet Width: _____ feet Depth: _____feet
      ii. Number of units (available as needed) ____
   c. ☐ Modified dumpster: _____size and number of units (available as needed) _____
   d. ☐ One time use (disposable) containments:
      i. Size/type/product _____
      ii. Number of units (available as needed) ____
   e. ☐ On-site constructed, above grade: _____ size and number of units ____
   f. ☐ On-site constructed, below grade _____ size and number of units ____
   Justification for use of below grade containment: _____
   _____
3. Additional information regarding how cementitious washwater will be contained or properly removed from the site. _____

Exhibit 710.03-K

MORTAR MIXING WASHWATER CONTAINMENT
TYPICAL PRACTICE WORKSHEET
(NOT TO SCALE)



Note: The illustrations in this exhibit are not intended to serve as construction drawings. This diagram is to be used to communicate the concepts for implementation of this control measure.

Source: IDEM