The Anatomy of a Wash Pad

A wash pad should be considered a integral part of a wash rack operation. This seemingly non purposeful object is typically disregarded as a spot where to park the devise you are about to wash. This is furthest from the truth when considering the filtration capacity of the surface area and the potential means by which wash water management is initially generated. This document is designed to provide basic information about the wash pad, its design characteristics and the integration of this main component to any wash water application.

The wash pad shown here is considered a properly designed wash pad. The following bullet points will describe why.

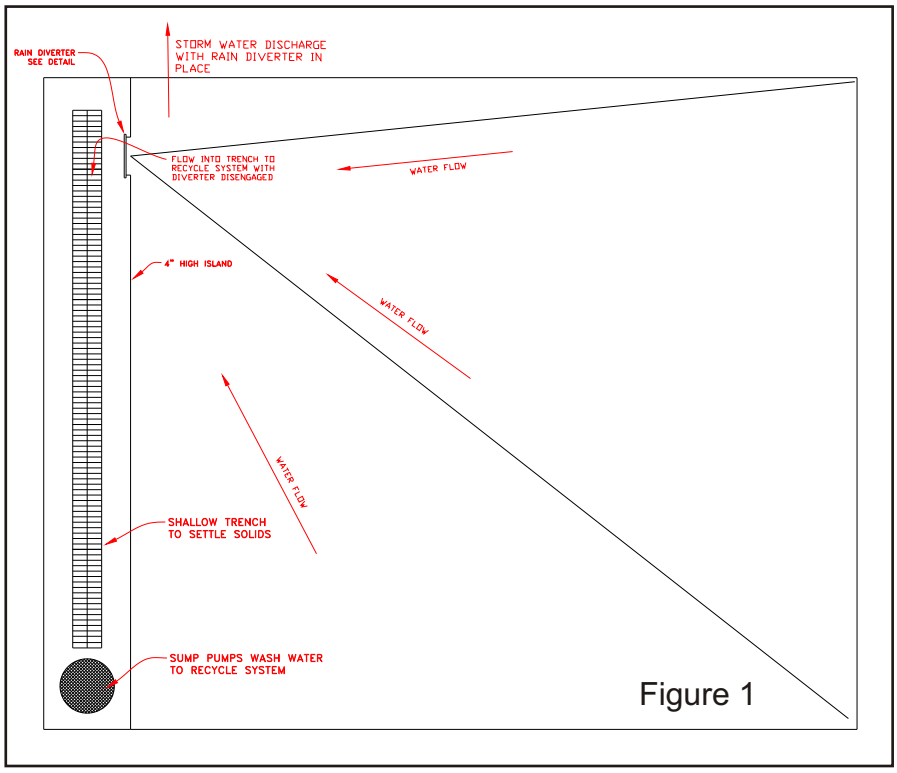

Figure 1

- The grade of the pad is designed to move the water to one corner of the pad using a shallow slope, 1/8" per foot, which allows solids to remain on the wash pad and not be swept off from aggressive flow. The wash pad should itself be used as a very large filter. The surface area and gradual slope filters many solids so that the water treatment equipment will not be over whelmed with excess solids.
- The wash pad is designed with a Rain Diverter that will remove storm water off the pad without entering the water treatment equipment. The design incorporated here shown in figure 2 uses a sliding gate that when closed blocks the path of the water to the trench and the grade of the wash pad then allows the water to leave the pad at the corner. The wash

wash pad will need to be cleaned after each use so that when the wash pad is set up to receive rain water, the rain water will not flush previous wash contaminants off the pad to the storm drain. This practice is described in the Florida DEP Best Management Practices for wash water recycling operations. See Figure4. Similar EPA instructions are written for each State.

- The trench shown in this wash pad design becomes the second phase of wash pad filtration by again generating a shallow grade, 1/8" per foot slope, to allow solids to settle in the trench before reaching the water treatment equipment. The trench is designed so that no water is allowed collect in the trench itself. The trench can also be fitted with removable weirs set in the bottom of the trench to further enhance the filtration by creating treacherous paths where solids will tend to accumulate. The weirs can simply be 2"angle iron that can be easily removed to allow a square nose shovel to be used to remove the collected solids. A shop vac also works well to remove the solids from the trench.
- An in ground separation/settling pit can be used in place of the trench to allow for oil water separation through baffling or solids settling through the use of water volumetrics. Using water volumetrics for settling increases the potential for BOD generation through reduced dissolved oxygen in the volume of water in the pit. Using water volumetrics also increases the amount of wet sludge that would eventually need to be hauled off site. Allowing solids to remain in a settling tank for long periods of time increases the contaminant levels in the sludge as more solids are added. Increased contaminant levels increases the amount paid to have the solids hauled off site. Solids that settle on a properly designed wash pad contain less contaminants and would be easier to discard.
- A sump at the end of the trench is used to collect and transfer the water to the water treatment equipment. The pump in the sump should be elevated off the bottom of the sump to allow for some solids to settle below the suction of the pump. The sump should be regularly cleaned to remove collected solids before reaching the sump suction.

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The rain gate can be designed in a variety of manners from simple gates like the one shown in Figure 2. They can also be elaborate using ball valves and automated gate type valves that can be controlled simply by using a flow switch on the wash water recycling system indicating that the wash pad is in use. The devise ensures that no rain water will enter the water treatment equipment by re-directing the storm water safely off the wash pad. It is important to ensure the wash pad is cleaned after each use to reduce the contaminants that could be flushed off the pad during a rain event.

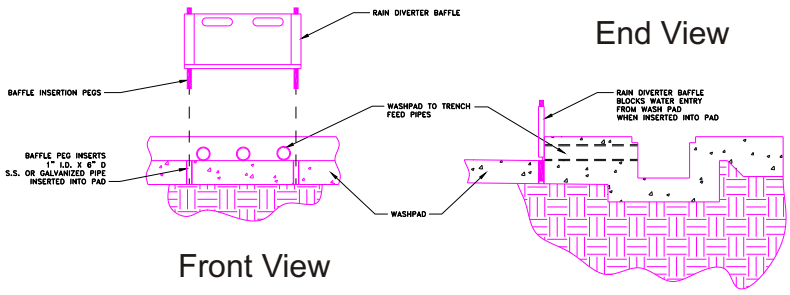

Figure 2

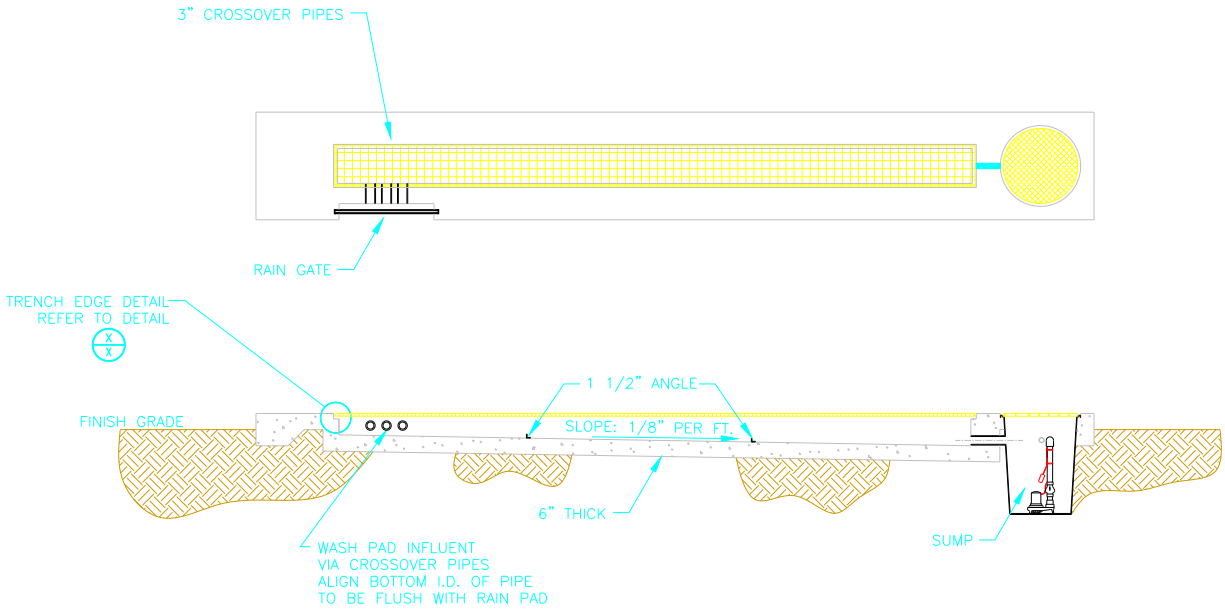

Figure 3

Figure 3 is a view of the trench and sump configuration as designed in Figure 1. The trench area is elevated above the wash pad at least 4 inches to allow the use of the rain gate. The trench and sump can have either a solid cover or a grating depending upon the area and choice of the client. The trench should be wide enough to allow the use of a square nose shovel to clean to accumulated solids from the trench. 2" angle iron weirs can be set across the bottom of the trench a few feet apart to create a treacherous path to allow solids to settle increasing filtration. The sump should have trash pump sized properly to allow the collected water to be sent to the water treatment equipment. De-tune the pump by installing a tee and ball valve in the line to decant flow to set the proper GPM going to the water treatment equipment.

Do not pre-wash, wash, or rinse vehicles outside or away from the wash area, to prevent wash water discharge to the ground or surface waters.

Figure 14. *Dirty water in this puddle just outside the car wash tunnel indicates some car washing took place outside the wash tunnel, allowing dirty water to run onto the ground instead of into the collection pit.*

Stormwater

Do not allow intrusion of stormwater into the recycle system. Install overhangs, roofing, or other devices on buildings. Also, install curbs around wash bays or tunnel entrances (or elevate bays or tunnels) as appropriate. This will avoid the overloading of the system's storage capacity, and the potential to cause a discharge.

Figure 15. *The collection pit at this car wash facility is located outside, adjacent to the wash tunnel. The pit is not covered, there is no overhang, and the downspout brings rain water right into the pit. This situation must be corrected.*

Figure 16. *The rain falling onto this wash pad can be diverted to the stormwater sewer via a removable rain water dam. This prevents the recycle system from overflowing due to excess volume. The wash pad must be thoroughly cleaned before diverting the rainfall off the pad and into the storm sewer.*

Figure 17. *This facility does not have a roof or other cover over the wash area. As a result, excess stormwater occasionally creates an overflow of wastewater into the stormwater pond adjacent to the system. This is not a desirable situation.*

If a wash pad can not be covered with a roof for various reasons (including cost), another way to prevent stormwater from overflowing the system, is to install a stormwater diversion valve. This allows the system to discharge uncontaminated stormwater runoff from the wash pad to an appropriate stormwater outfall when the pad is not in use.

Figure 18. *The wash pad at this facility is equipped with a stormwater diversion valve.*

If the system is equipped with a stormwater diversion valve, the following procedures must be followed to insure proper results:

- The wash pad must be cleaned with fresh makeup water after each day of use to prevent stormwater contamination.
- The rain diverter valve must be in the proper position (according with the operation procedures) before starting the wash operations.
- Discharge of solids is not allowed.
- The discharge of uncontaminated stormwater must not cause a visible sheen.

Solids

Prior to disposal, separator sludge must be sampled to determine if it is a hazardous waste. (See section I.A. of this document for more information.) Sludge and solids from sedimentation tanks, centrifugal separator, used filter material, and other solid wastes, that are not hazardous, must be disposed of at a Class I or Class II lined, solid waste landfill authorized by the Department to accept solid wastes under Chapter 62-701, F.A.C. A record of the quantity of waste sludge disposed, contract hauler, disposal location, and disposal date for the sludge must be maintained.

Sludges and sediments from the oil section of the oil-water separator can be managed by the used oil handler as an “oily waste” such that both used oil and such sludges can be handled at the same time by one handler. This can also apply to drip pads and sorbent materials used to clean up releases of used oil.

Settled solids must be frequently removed, to prevent drains from clogging, or sumps from overflowing. Used filters and other solid waste must be stored

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Designs to avoid:

Large volume settling tanks

It has been conventional wisdom to use large volume tanks of water to settle solids as a pre-treatment. This process obviously works to settle solids and has been used for many years. The issue with this process is that as the solids accumulate in the pit or tank, the organic's that are intermixed begin to degrade and absorb dissolved oxygen creating a septic condition. As water is circulated the septic water is mixed throughout the entire system decreasing the overall water quality. Another disadvantage of large settling pits is that the solids that accumulate generate high costs when they are removed from the pits and hauled off site. Typically these pits are left without any attention allowing the solids to build to the point where the use of volumetric settling no longer exists. The solids that accumulate also give off increased contaminants being dissolved by the water they sit in which further reduces water quality in the entire system. To counter this an operator will need to add additional oxidation to combat the increasing BOD. Usually the addition of oxidation is done in large quantities added at one time where there may be a spike in the oxidation potential but then is quickly absorbed by the strong septic conditions. A wash pad should remove as much of the solids as possible prior to coming in contact with volumes of water. If this design is needed or unavoidable then it must be stressed that the solids will need to be evacuated often in order to not impact the entire system.

Center Sump Designs

Center sump designs present a few challenges. One of them is described above where the volume of water that accumulates in the center sump can increase the over all contaminant level in the entire system from the degradation of the accumulated solids that will remain in this design. Usually this collection area is not circulated and during the non operational periods which could be lengthy creates an environment suitable for anaerobic bacteria to flourish. When the sump area is used in a subsequent wash the septic volume is transferred into the water that has been filtered and oxidized reversing the treatment that has taken place. Another issue with this design is the reduced ability to divert rain water away from the water treatment system. The issue with rain water diversion using this design is that the rain water diversion technology is typically a valve system that sends rain water that collects in the same sump as wash water out of the collection sump to a storm drain or swale. The rain water that is now contaminated with wash water in turn contaminates the storm drain or swale creating an illegal discharge. A method used to combat this has been to send the first flush from the wash pad to the water treatment equipment by using a rain detection device and timer to first pump the contaminated rain water to the treatment and then change the valves position and send the subsequent volume to the storm drain or swale. A program such as this becomes difficult to manage since rain events can be light or heavy where as the timing device has no control over the volume of water that is first sent to the water treatment equipment creating overflow conditions.

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Designs to avoid:

Aggressive Slopes

In order to use the wash pad as a very large filter, the grade or slope used to direct water to a collection area must be minimal to allow the solids to settle where they fall while the water heads for the collection area. Aggressive slopes in the trench can be detrimental by not allowing the solids to settle and the ones that do can be flushed through the trench rendering the design useless.

Favorable designs:

Draining Solids from Water Treatment Equipment

All wash pad designs should have a means to drain the solids that will accumulate in the water treatment equipments tanks and filter housings back to the wash pad or to the beginning of the trench. This will allow frequent solids relief from the water treatment equipment and send it where it can be easily removed. Some designs send the draining to the first part of the trench to get the full length of the trench to settle the solids and some designs send the draining to a opposite corner of the pad and use the wash pad itself to capture the solids from the draining.

Circulating the Water

When looking at the design of the wash pad, circulation is a required step. The water in a water treatment system needs to be circulated with volumes that may be in wash pad designs to ensure they are included in the oxidation potential of the system. If the wash pad uses a volume of water for separation or settling, ensure there is a bleed back from the water treatment equipment to this volume of water to generate full system circulation. This process will ensure that during the non operational periods there is no standing water. When looking at this ensure you do not create a situation where rain diversion will empty the water treatment system from the bleed back operation.

Size Considerations

Wash pad design must complement the operation and assist in the settling and removal of solids. Ensure the wash pad is large enough for the equipment being washed and that the size allows for solids removal by not having to park the vehicle to be washed right next to the collection area. This mistake will limit the wash pads ability to filter the solids. When designing a wash pad the bigger the better. Larger pads also assist in evaporation of the water where fresh water rinses are allowed and help the overall water quality of the system. Evaporation of the wash water on the pad removes contaminants from the system and collects them where they can be easily removed, on the pad.

Sanitary Sewer

If discharge to a sanitary sewer is available, it could help maintain the overall water quality by overflowing rinse water volumes to this entity. Regulations allow for a 20% discharge to sanitary sewer but the proper permits need to be acquired and testing may be required. This allows for more liberal rinsing.