PROJECT PROFILE

CONSTRUCTION ECO SERVICES

Pond Remediation
Spring Dodge Auto Dealership
Houston, Texas

In and around the Houston area, detention pond issues are the source of many a headache for property owners. Improperly vegetated and unstable detention ponds are a common sight. some ponds require vegetative maintenance or turf reestablishment. However, some issues can create the need for an extensive overhaul, including reengineering of the pond and extensive dirt work.

Project Background

Spring Dodge, an auto dealership in North Houston, faced an enormous task, when large sink holes began forming in areas to the north and the west of their detention pond at the back of the property. The cause of the sink holes was unknown, but they were expanding rapidly; so much so that the sides of the detention pond began to cave in as storm water from adjacent properties flowed over and around the highly erosive soils. Storm events only added to the erosion problems, as storm water carved massive channels through the unstable areas.

In diagnosing what was causing the erosion problems the dealership turned to Lentz Engineering, the local engineering firm that had performed the original civil engineering design. Lentz quickly determined the causes behind the sink holes and erosion problems that were escalating.

Diagnosis

The first area of concern was along the western edge of the pond, where a data cable easement separates the dealership property from a neighboring subdivision. When AT&T had performed some monitoring of the data cable, several holes were bored into the soil to the depth where the cable was buried. When it rained, runoff from the easement area and the neighboring subdivision drained through the bored holes, where it hit a layer of shallow sand seams underneath the top soils. Due to the nature of the sand, storm water easily flowed horizontally through the sand, and found its way through the side of the slopes of the detention pond that could not withstand the force of the flowing storm water. As the flow of storm water through the bored holes increased, the areas expanded and subsequently the sink holes began to form.

The second area of concern was to the north of the property, which is bordered by a vacant, wooded area, separated from the dealership's property by a chain link fence. In a particularly high flow area, the pressure of storm water began to erode the soil around the fence post that was cemented into the ground. As the soil washed away, the volume of storm water became strong enough to tunnel its way through the soil, where it too found a sand seam underlying the top soils. Another issue in this area of the pond was overland flow of storm water. With the flow of storm water undermining the structural integrity of the pond, the surface area was compromised and the velocity of the overland flow of storm water increased, carving out deep troughs through the bank and the side of the pond.

As the sink holes grew and expanded, so did the extent of the repairs that would be needed. The quantity of offsite runoff flowing onto the dealership's property needed to be managed, and needed to drain more quickly, in order to prevent any future distress to the soils.

Green Armor

A soft armor system comprised of two parts: Enkamat a turf reinformcement mat, and Flexterra Flexible Growth Medium, a hydraulically applied erosion control blanket. When combined, tthese two products provide a structural support system for erosion prone, highflow areas, without lsosing the aesthetic value of vegetation which is lost in traditional hard armor systems.

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The Solution

The solution was two-fold: to remediate and restore the land and the slopes that had severely eroded; and to provide adequate drainage and outlet for storm water draining to those areas. In order to accomplish this, fill soils were brought in to fill the sink holes, and two grate inlets, two catch basins, and two 12" pipes, which would provide necessary drainage of storm water runoff from the adjacent propertied, were installed.

Another product that was brought in was Enkamat, a nylon Turf Reinforcement Mat that is woven to create a three-dimensional reinforcement for root systems. Enkamat is strong enough to withstand high flow velocities, which is one of the primary causes of soil erosion, and therefore provides the base structure essential to establishing and maintaining vegetation, which is one of the best ways to prevent erosion in high flow areas.

Construction

The first steps included clearing the land, as much of the area was heavily overgrown with weeds and noxious vegetation. The sink holes were then backfilled and the entire pond was regraded. The two inlets and catch basins were also installed in low points where offsite runoff would drain, through the 12" outlet pipes which would outfall directly into the pond.

Next, the Enkamat was installed and anchored to the soil, in the areas most susceptible to erosion. These were areas around the new inlets that were installed and along the banks and slopes of the pond where the sink holes had formed. The soil around the outfall pipe from the north inlet required additional reinforcement, and therefore rip rap was brought in and placed around the outfall pipe.

The final steps were to reestablish vegetation on the newly restored soils. Rather than using the typical hydromulch mix, the contractor was advised to use Flexterra Flexible Growth Medium, a hydraulically applied erosion control blanket with tackifiers that bond the seed to the soil, providing a greater success for native vegetative establishment. Specifically in the areas where Enkamat had been installed, when combined with Flexterra, a "soft" armoring system was created, which further reduces the possibility that erosion might occur in those areas.

Summary

The problems faced at Spring Dodge were unavoidable, as they were not due to a lack of maintenance, poor construction, or any of the many contributors to slope failure and erosion problems. The solutions, however, are universal. One of the most difficult issues with detention ponds is stabilizing the slopes. A simple hydroseed application is rarely sufficient. One significant rain event occurs and the seed that was applied will end up in the bottom of the pond, and the end result is bare soil that has already experienced some erosion and is already in need of repairs. Establishing vegetation properly from the start will solve many future slope issues.

Our Stormwater Quality Services department has years of research and experience in slope stabilization and pond remediation. We will work with you to determine the most efficient solution, utilizing the best products on the market.

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