Rain Garden As-Built Report: Town Branch Creek

Water Body: Town Branch Creek (Segment 1810A), a tributary to Plum Creek
Grantee: City of Lockhart, Texas
Subgrantee: Nueces River Authority (NRA)
TCEQ Contract No: 18-80212
Report Date: June 1, 2020

PREPARED IN COOPERATION WITH THE
TEXAS COMMISSION ON ENVIRONMENTAL QUALI1Y AND
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Background & Introduction

The 2014 Texas Integrated Report identified elevated bacteria concentrations and concerns for impaired habitat, nitrates, and total phosphorus in Plum Creek, segment 1810_02. The report also listed Town Branch Creek, segment 1810A, a tributary of Plum Creek, with water quality concerns for bacteria concentrations in excess of the standard, depressed dissolved oxygen, and excessive nitrate levels.

An evaluation of the riparian functional conditions along Town Branch Creek was included in TCEQ project #18-80212 to help inform creek restoration plans. The evaluation identified opportunities for improved function through the implementation of Best Management Practices designed to address an identified hinderance.

After the evaluation a Best Management Practice (BMP) Report was produced identifying specific practices to address the identified hinderances and help improve water quality in Town Branch Creek. The report focused on BMP's that could be implemented on City owned property including a special focus on two reaches; the Urban Trail Reach and the City Park Reach.

Within the City Park Reach, the report recommended the installation of a rain garden to be accompanied with a mowing setback and riparian plantings at BMP Site 2, with a priority ranking of HIGH. Rain Gardens can be used to slow and filter storm water runoff from parking lots, roadways, or driveways through temporary collection of the water. The Lockhart Rain Garden was designed to utilize an existing depression adjacent to the overflow drain passing under a park road which runs between the small park lake and the creek bank.

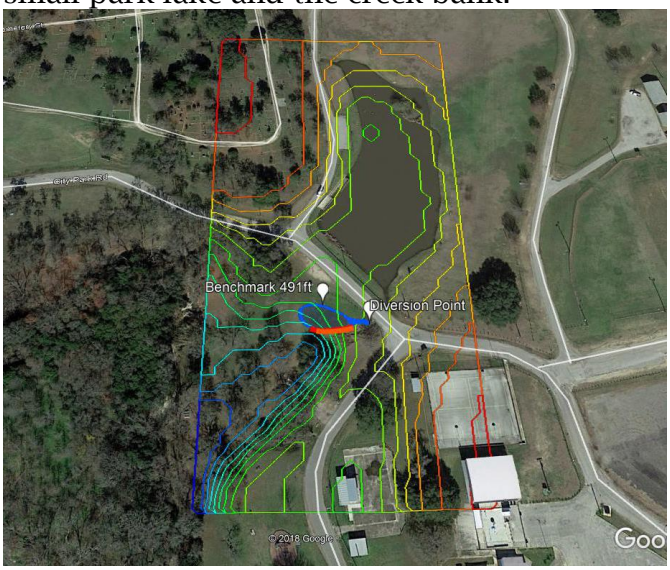

Fig 1. Google Earth ™ image of the City Park Rain Garden site with topographic contours overlain and diversion point and garden site identified.

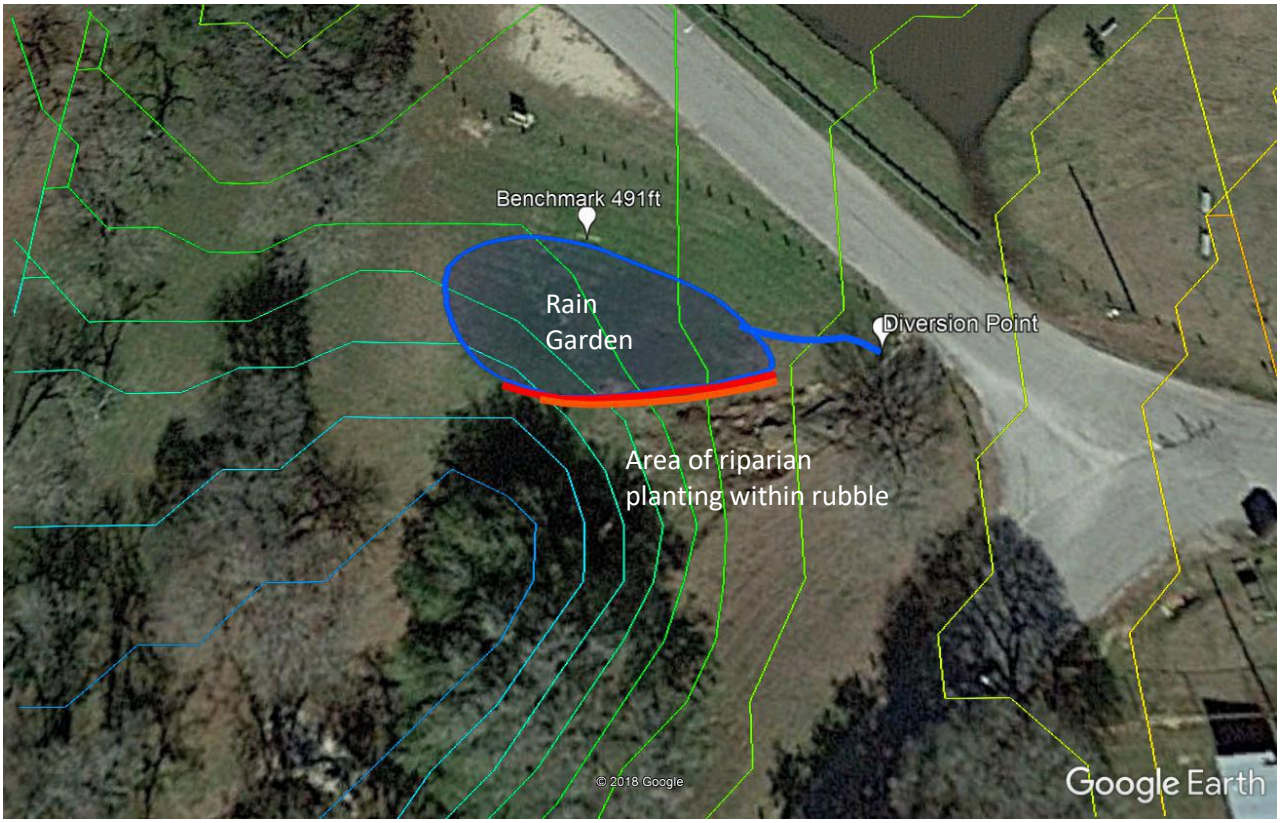

Fig 2. Google Earth ™ close-up image of the City Park Rain Garden site with topographic contours overlain and diversion point and garden site identified at location 29˚53'17.42"N 97˚40'4.04"W

Rain Garden Construction

On May 4, 5 and 6, 2020 City staff and a contractor, Nueces River Authority (NRA), and Native American Seed (NAS) began the garden development and associated riparian planting. Native American Seed (NAS) provided consultation, interpretation and guidance to the City's dirt contractor and parks staff. The NAS team communicated goals, objectives, and outline steps to build the rain garden and enhance upper portion of main drainage channel. NAS provided three days of on-site guidance for City staff and their contractor to produce the diversion swale, sculpt the garden floor and install large wood to direct runoff to the garden site with the least possible disturbance of soils.

Fig 3. Rain Garden site with City contractor preparing the "bowl" and placing large wood and rock to divert approx.. 30% of flow from the drain into the garden area.

The City's equipment contractor made cuts and fills aimed at constructing a stable, compacted berm with near perfect level, uniform consistency while leveling the garden floor to contain and spread diverted stormwater. Care was taken to hold constructed elevations while creating and producing the final grades. The site was then scarified and raked to final grade. Large dead trees and large rocks were used to create and anchor a diversion from the nearby drain. NAS personnel installed turf matting and riparian plants and seeds. When the garden site was finished City staff began immediately providing supplemental water and a few days afterward approx.. 4 inches of rain fell and the first runoff event occurred which filled the rain garden and offered insight into how it will function.

Fig 4. A form of turf matting was installed, and riparian plants were plugged into the fabric.

Rain Garden Designed and As-Built

Fig 5. Shows the drain way at the diversion point as designed.

Fig 6. Rain garden diversion point as built.

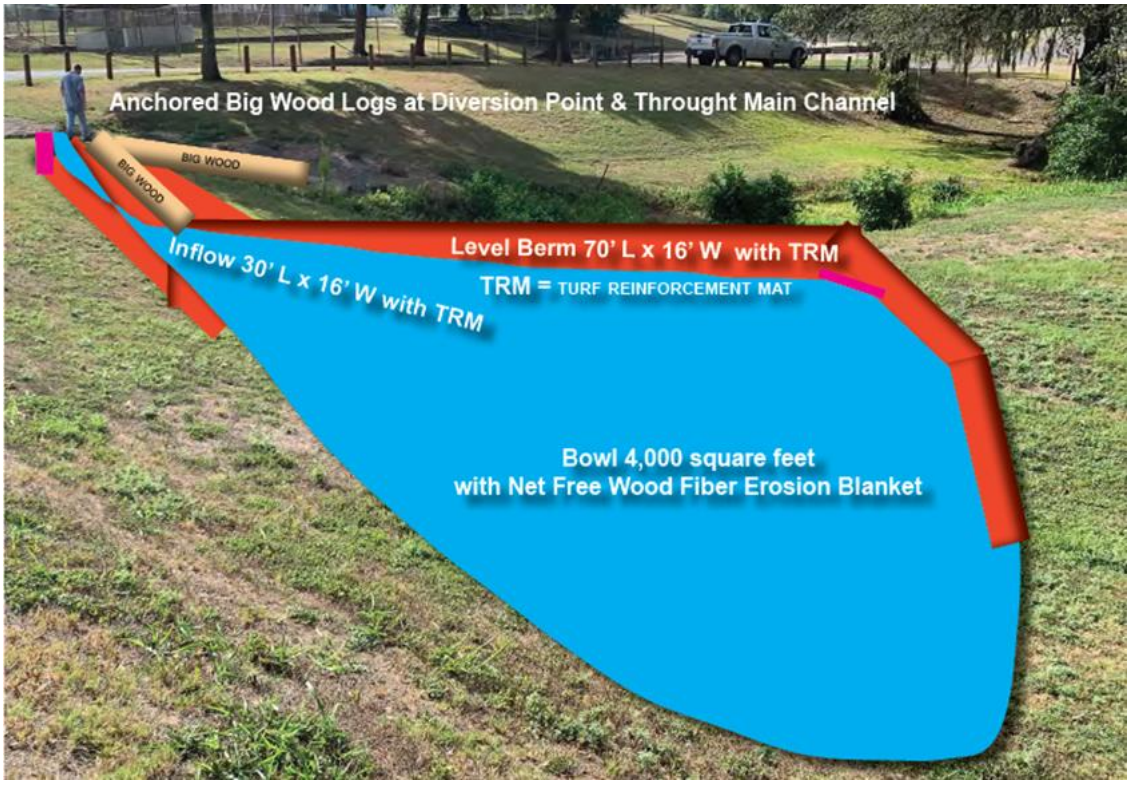

Fig 7. Rain garden dimensions as designed.

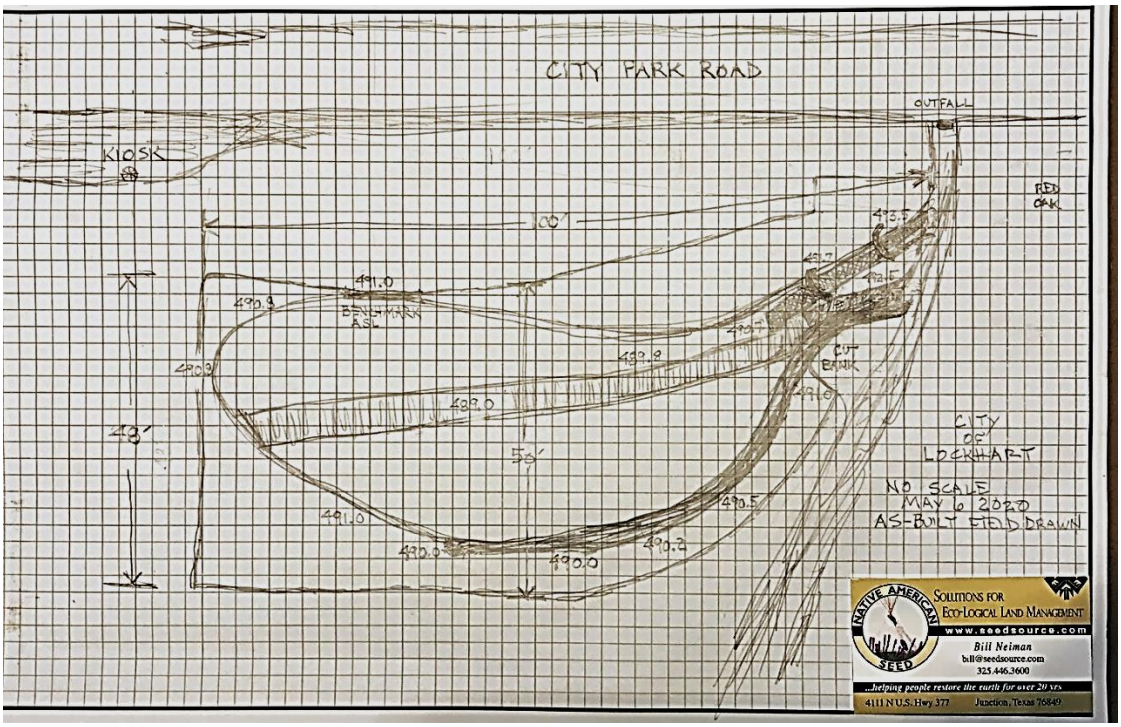

Fig 8. NAS personnel prepared this drawing with as-built dimensions of the rain garden.

Fig 9. A few days after installation a 4 inch rain fell and City staff captured this image showing approx. 1/3rd of the flow from the conduit being diverted into the garden. Slow overtopping occurred, as expected, along the downslope edge of the bowl. Once the planted vegetation has developed this area is expected to become more and more stable further slowing over-toping while trapping floating debris.

Rain Garden Plants

Vegetation is a common tool for stream-bank protection, particularly in small tributaries. Vegetation has the advantage of being self-propagating and self-repairing. Riparian vegetation provides two levels of protection. First, the root system helps to hold the bank soil together and increase overall bank stability by forming an interweaving network. Second, the stalks, stems, branches, and foliage provide resistance to stream flow, absorbing flow energy rather than deflecting it as hardened structures do or allowing it to erode soil particles. Vegetative cover protects the banks from rainfall, runoff, and trampling forces. Riparian vegetation also provides water quality benefits by causing settling of particulates and absorbed pollutants and by assimilating nutrients from the soil.

Plants are rated for their ability to withstand floods with a stability rating (SR). SR1 is bare ground and SR10 is equivalent to the strength to anchored rock. SR6/7 is considered the minimum SR necessary for adequate bank stability along a drainage way. These ratings are based on the information published in *USDA TR47: Monitoring Vegetation Resources in Riparian Areas*, A. Winward, 2000, and can be found in the Remarkable Riparian Field Guide. The wetland indicator status, based on the U. S. Fish and Wildlife Service's Wetland Plant List (1988), for Obligate (OBL) and Facultative Wetland (FACW) plants to indicates water storage capacity as well as the plants ability to withstand wet and dry conditions.

The rain garden development included installation of the native riparian and upland species with special characteristics to stabilize soils and provide aesthetic attributes including showy flowers and pollinator attractants.

The following plants were installed in the rain garden bowl as well as along its fringes, along the diversion and within the rubble filled channel of the drain way:

Description	Type	Amt. Planted	Wetland Status	Stability Rating
Tall goldenrod	Live roots	15 bundles	FACW	6/7
Tall aster	Live roots	15 bundles	FACW	5
Dam slope mix	Seed mix	1 lb.	FAC	NA
Upper slope wildflower mix	Seed mix	2 lbs.	UPL	NA
Wetland fringe mix	Seed mix	2 lbs.	FACW	NA
Illinois bundleflower	Seed	2 lbs.	UPL	NA
Eastern gamma	Seedlings	200 transplants	FAC	9
Switchgrass	Seedlings	183 transplants	FAC	8/9
Maximillian sunflower	Seedlings	50 transplants	UPL	NA

Fig. 10 Riparian plants installed as part of the rain garden developmen