TEXAS STATE
INGRAM SCHOOL OF ENGINEERING

Group C1.01

Onion Creek Senior Center Expansion

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JEEN ENGINEERING

INTRODUCTION

In 2013 the Onion Creek Senior Center opened its doors and has served as a place of community for the senior residents in Buda, Texas. With an increasing senior population, there is demand for a larger and more accommodating space. This project aims to improve accessibility and amenities at the Onion Creek Senior Center by expanding the existing facility through the addition of both a parking lot and a building extension.

Given the senior center's non-profit status and budget constraints, cost will be the most limiting factor for this expansion project.

In developing and design of this project, alternative solutions will be vital towards determining the most cost-effective approaches for both the parking lot expansion and building addition.

Overall, the goal of this project is to achieve a timely and budget-conscious expansion, focusing on design considerations, sustainability, and thorough cost/life-cycle analysis.

SUSTAINABILITY

Low Impact Development (LID)

Primarily focused on managing stormwater runoff and reducing the environmental impact of development on local ecosystems through **eight** set principles. These principles help to aid developers in avoiding any environmental impacts that may be cause detriment to a site and nearby areas.

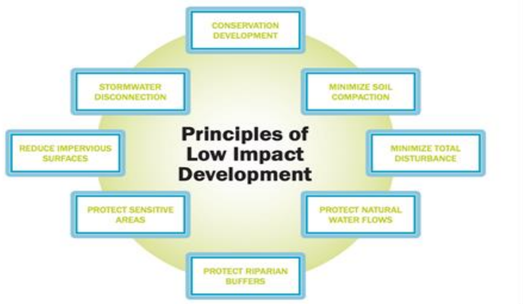

Figure 1: Low Impact Development Principles

The applicability of all eight LID principles was carefully evaluated to ensure each aligned with the overall scope of this project.

Analysis

Our design aims to prioritize land conservation for both the building and parking lot additions, ensuring minimal disruption to the site during construction.

Incorporating each of these principles into our analysis, it was determined that **six** out of the eight LID principles would be **applicable** to our site providing a **silver** rating.

PROJECT SITE

Onion Creek Senior Center – Buda, Texas

Figure 2: Proposed site location

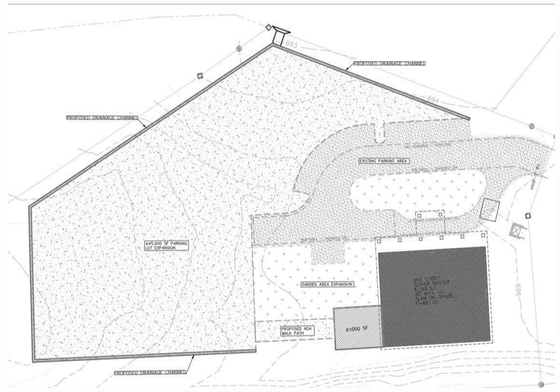

Figure 3: Proposed site expansion.

DESIGN CONSIDERATIONS

01. Landfill

The proposed location for the expansion of the current parking lot once served as a construction landfill site. This poses constraints due to the **uncertainties** regarding the **subgrade conditions.**

02. Drainage

Addition of parking lot will require the **removal and reroute** of the current drainage swale & piping system. To accommodate the number of spaces being added, an **increase in impervious areas** will be necessary.

03. High-Power Lines

Anticipated site for building extension lies underneath high-power lines. Must **adhere** to the **minimum clearance distances** suitable to ensure safety and prevent any potential hazards that might arise during construction

DESIGN ALTERNATIVE

- Use of bio swales to help decrease soil erosion from site and to treat stormwater runoff.
- Use of permeable pavement to decrease total impervious area.

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- Use of permeable pipe network under parking lot expansion to allow water to be properly treated.
- Determine smallest building addition that meets client's needs to reduce impervious cover and disturbance.
- Total of approximately 54 stalls, including 8 ADA compliant stalls.
- Keep construction out of existing riparian buffers adjacent to Onion Creek.
- Design for grass island(s) between parking areas.

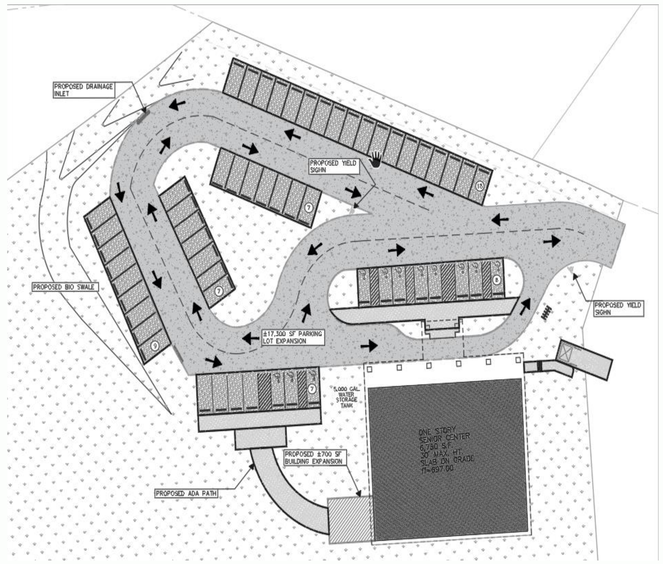

Figure 4: Completed Design Alternative

CAPITAL & LIFE-CYCLE COSTS

Outlined below are the various cost estimates, minimum to maximum, this expansion will be subject too.

Table 1: Capital Costs for Site Expansion

Capital Costs				
Item	**Unit**	**Quantity**	**Minimum Cost**	**Maximum Cost**
Permeable Pavement	SF	17,300	138,400	346,000
Building Expansion	SF	700	49,000	350,000
ADA Sidewalks/Walkways	SF	2,600	15,314	31,200
Land Grading	SF	7,000	7,000	70,000
Bioswales	LF	300	17,400	
Parking Lot Paints	SF	17,300	600	2,000
Excavation of Previous Parking	CY	8,500	21,250	127,500

Table 2: Life-Cycle Costs for Site Expansion

Life Cycle Costs				
Item	**Unit**	**Quantity**	**Minimum Cost**	**Maximum Cost**
Permeable Pavement Maintenance	SF	17,300	4,325	17,300
ADA Sidewalks/Walkways Maintenance	SF	2,600	7,800	52,000
Bioswales Maintenance	LF	300	1,293	

Note: Estimates will vary due to the client's budget and project preferences.

SECOND SEMESTER PLAN

Semester II will consist of finalizing material and alternative selections, finalizing cost estimates, creating a preliminary sheet for a consulting company, and discussing a possible phase II plan. This phase II plan would include an entrance directly from the adjacent roadway to the senior center, and excavation of the current construction landfill to further the properties development.

TEAM MEMBERS

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