

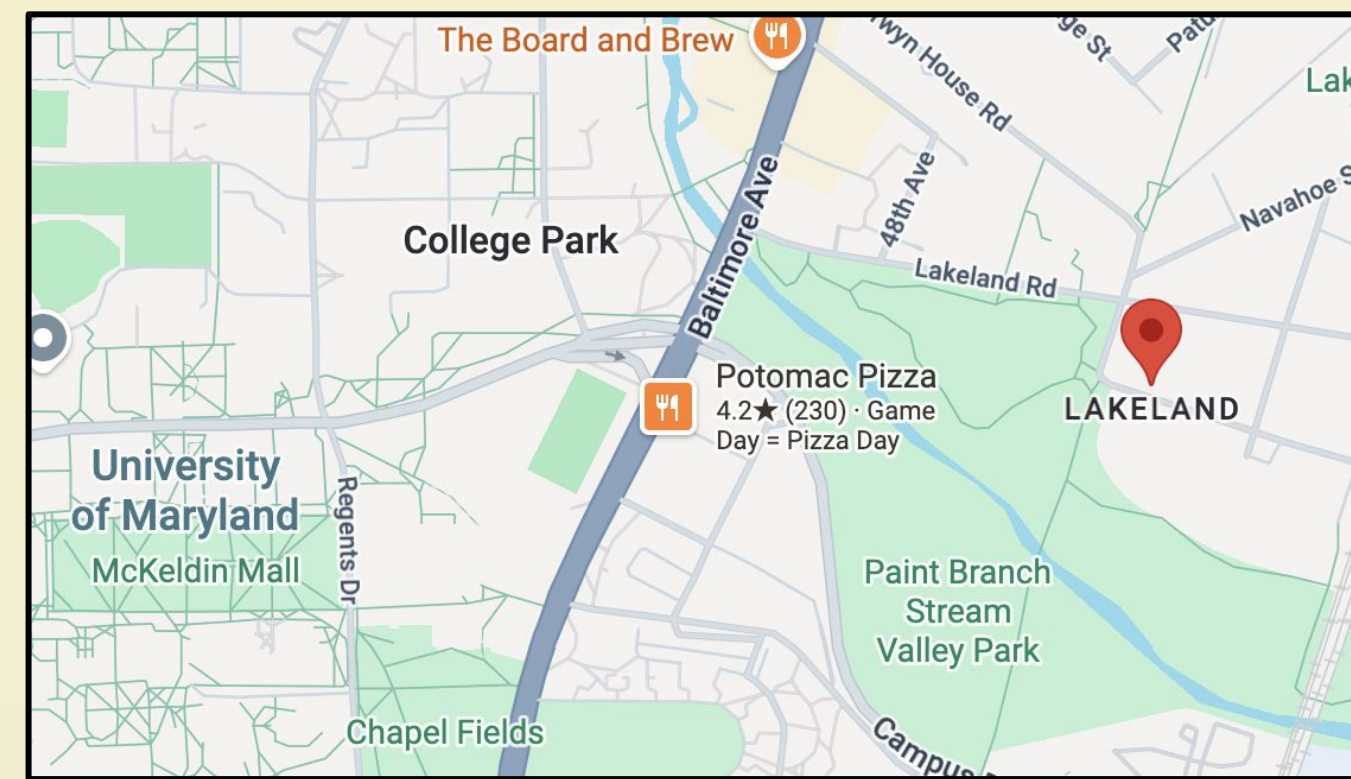


Project Definition

In the 1970s, the Urban Renewal Plan was introduced in Lakeland, MD, a historic African-American community, to mitigate future flooding. However, it led to the demolition of existing homes and displacement of approximately two-thirds of residents.



Existing Site



Site Location

The City of College Park acquired a 6,036 square foot lot in Lakeland, College Park, located between 5004 and 5006 Pierce Avenue, to create a space that fosters communal gathering and honors the Lakeland community's historical identity.

Methods

Task 0: Collaborate with other groups to develop community survey by conducting a pre-test survey

Task 1: Collect collaborative survey results and develop design requirements and elements

Task 2: Develop first conceptual designs iteration and receive feedback from consultant and stakeholders

Task 3: Finalize final conceptual designs in Revit by selecting material type, performing load calculations, and creating a demolition plan

Task 4: Itemize a final cost estimate based on our final conceptual designs and recommendations

Design Criteria

Based on the survey findings, our group found that the community placed the most importance on accessibility, historical storytelling and sustainability. Our design must be fully accessible, incorporate Lakeland's historical background, and include low maintenance materials and sustainable elements in our final conceptual designs.

Acknowledgements:

Special thanks to our sponsor, the City of College Park, and our professors, Dr. Niemeier and Dr. Bella

Final Design

Beams

- 8 beams (2''x 8''x 8')

Benches

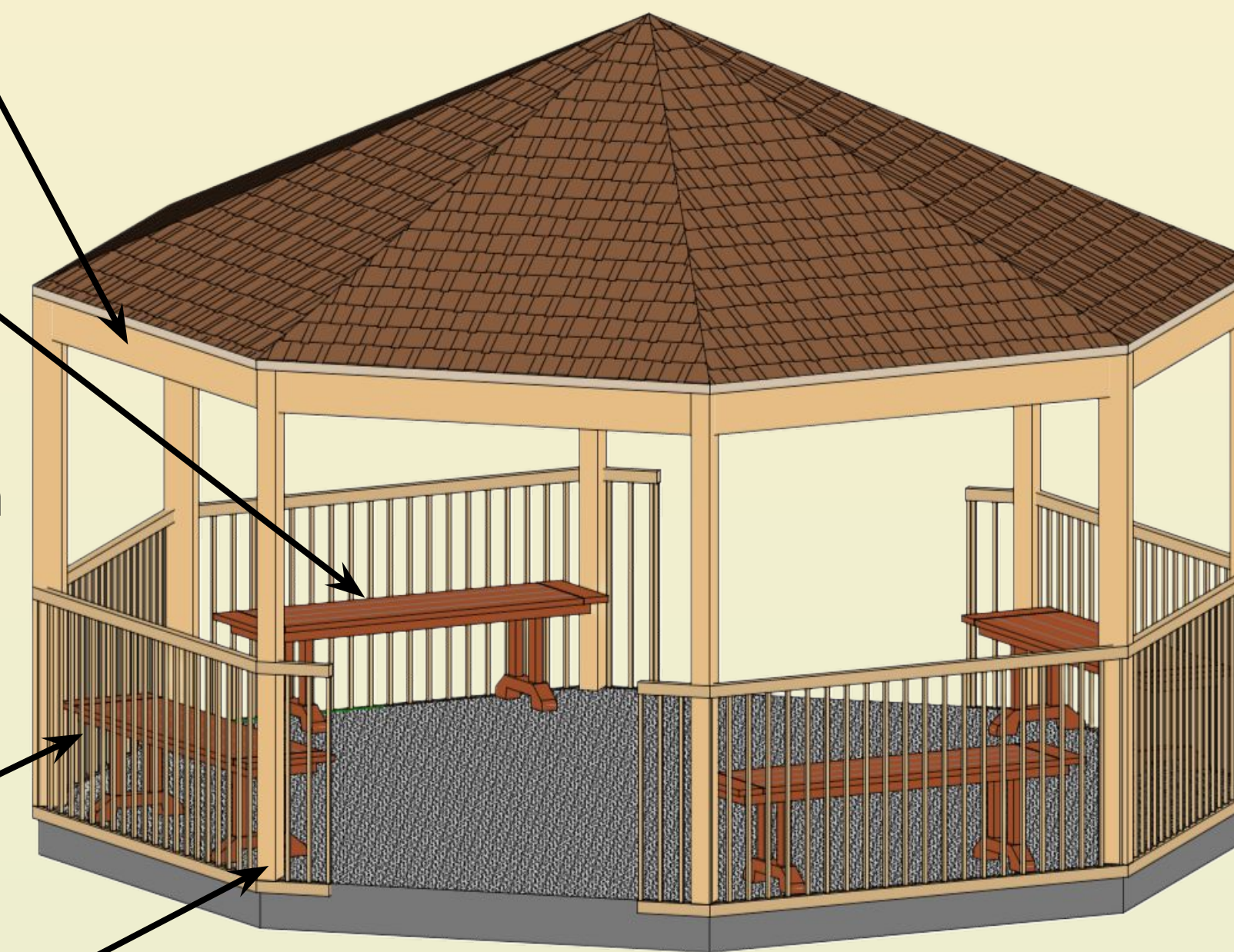
- 4 ADA-compliant benches w/ accessible approach (48''x 30'' open space)

Railings

- 6 railings (7' 0.5'')

Columns

- 8 columns (6''x 6''x 10')



Proposed Gazebo

Pathways

- Material: Concrete
- 36-60 in. (3-5 ft) of horizontal clearance
- Lead into and out of gazebo and around garden

Gazebo

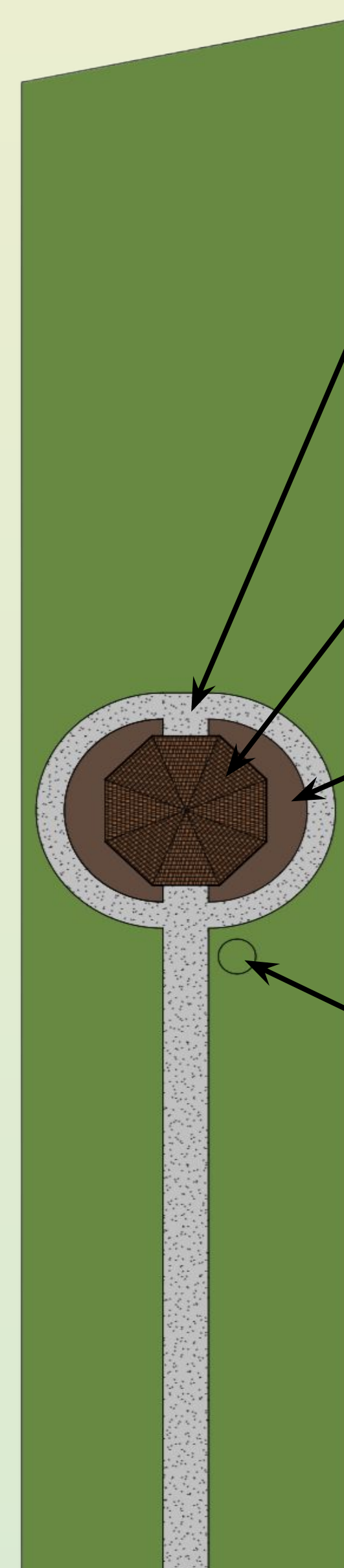
- Material: California Redwood
- Ground-level

Native Plant Garden

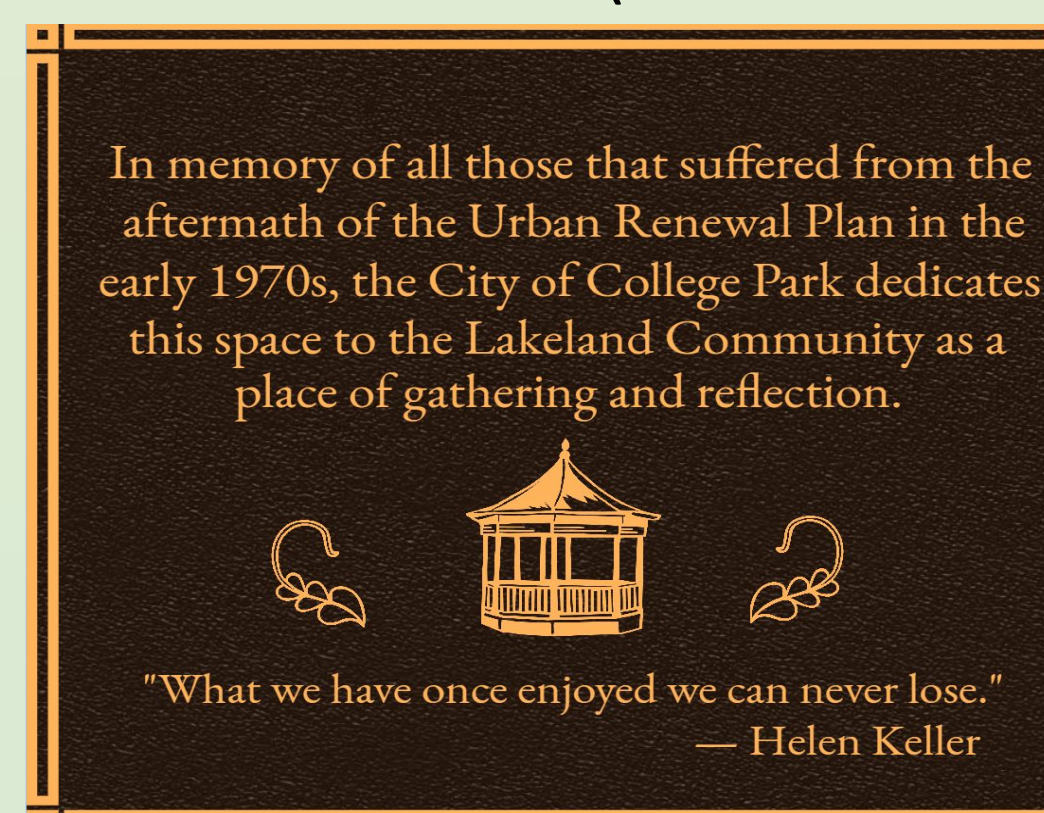
- Acidic, well-drained soil
- Supports moderate pollinator activity
- Ex: Little Bluestem, Switchgrass, Golden Ragwort, Foamflower, American Alumroot

Memorial Plaque

- Material: Bronze (Size: 14'' x 10'')



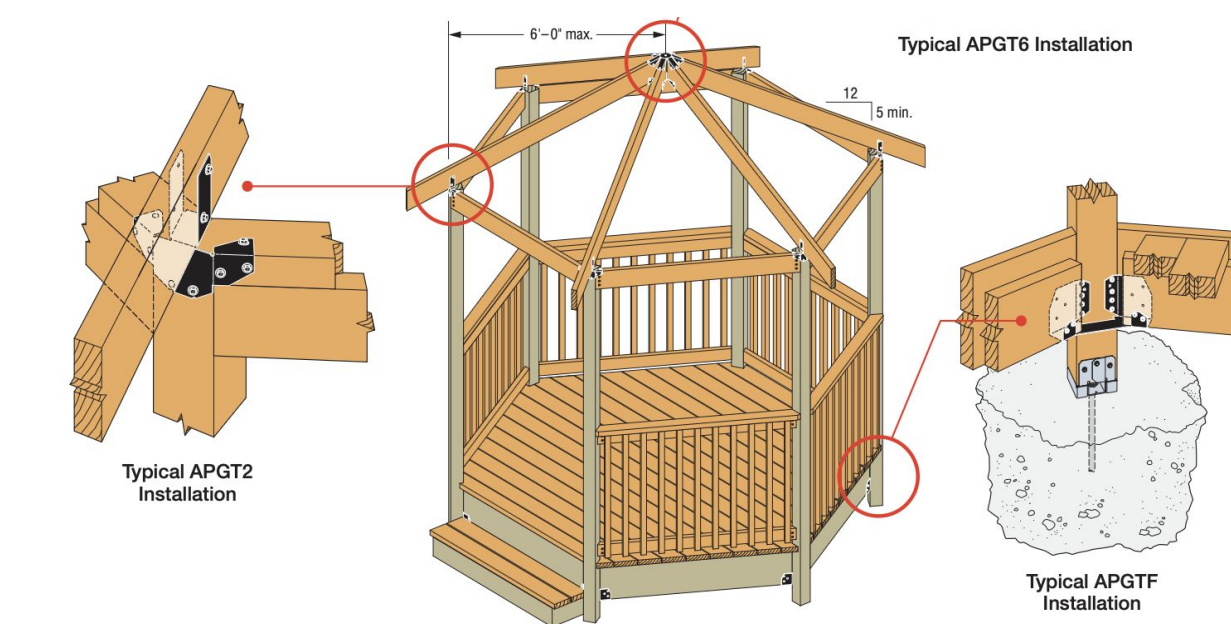
Proposed Site



Calculations & Analysis

Bolt Connections

- Referencing NDS Table 12.2A for strength
 - Wmax = 122 lbs/in of penetration
 - Length of nail - Thickness of connector = Depth = 1.5 in - 0.06 in = 1.44 in
 - 12 nails/connection => (12)(1.44 in)(122 lbs/in) = 2108.16 lbs
 - 2108.16 lbs = 9377.8 N
- Simpson Strong-Tie provided connection diagram:



Lift force on columns

- P = air density = 1.225 kg/m^3
- Vreg = 8.05 m/s (18 mph)
- Vsevere = 13.4 m/s (35 mph)
- Vextreme = 31.3 m/s (70 mph)
- Dynamic Pressure = q = 0.5 * rho * V^2
 - qreg = 39.6592 N
 - qsevere = 109.9805 N
 - qextreme = 600.06 N
- Fwind = q * A * Cnet
 - A = 18.9 m^2
 - F = 1499.1175 N
 - Fsevere = 4157.2629 N
 - Fextreme = 22682.268 N
- Tensile strength
 - California Redwood = 62.7 kpa
 - Western Cedar Wood = 45 kpa
- Column cross sectional area
 - A = 0.0232 m^2
- Wind force per column (F/8)
 - Freg = 187.39 N
 - Fsevere = 519.66 N
 - Fextreme = 2835.2835 N
- Stress (sigma, F/A)
 - sigma reg = 8.508 kpa
 - sigma severe = 22.4 kpa
 - sigma extreme = 122.21 kpa

Euler's Critical Buckling Load:

- Assume: Fixed-Pinned => K = 0.7
- Column: 6'' x 6'' x 10'
- Moment of Inertia: I = bh^3/12 = (6 in)(6 in)^3/12 = 108 in^4
- Euler's Critical Buckling Load Formula: Pcr = 2EI/(KL)^2
- Wood Type 1: Western Red Cedar E = 1.11106 psi
 - Pcr = 2(1.11106 psi)(108 in^4)/((0.7)(120 in))^2 = 167,683 lbs
- Wood Type 2: California Redwood E = 1.22106 psi
 - Pcr = 2(1.22106 psi)(108 in^4)/((0.7)(120 in))^2 = 184,300 lbs

Cost Estimate

Budget: \$25,000

Title	Cost
Gazebo	\$8,767.38
Landscaping	\$1,061.89
Garden	\$1,316.70
Demolition	\$3,147.66
Labor	\$2,700.00
Plaque	\$1,006.00
Concrete	\$6,964.55
Total:	\$24,964.18

