

# Civil Engineering Senior Design

## Water Park

### Desoto County, Mississippi

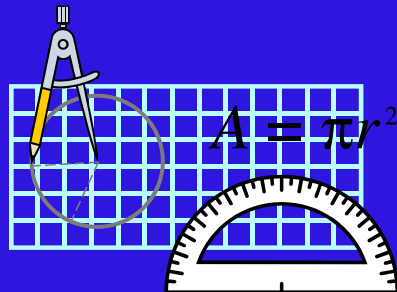


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C.E. 456: CIVIL ENGINEERING DESIGN II

## Outline

- Site Justification
- Site Layout
- Environmental
- Transportation
- Structural
- Cost and Schedule
- Conclusion



## Introduction

- 22 Acre Water Park

- Rides

- Straight Down Thrill Ride
    - Long Winding Slide
    - Funnel Slide
    - Intertube Slide
    - Circular Slide

- Amenities

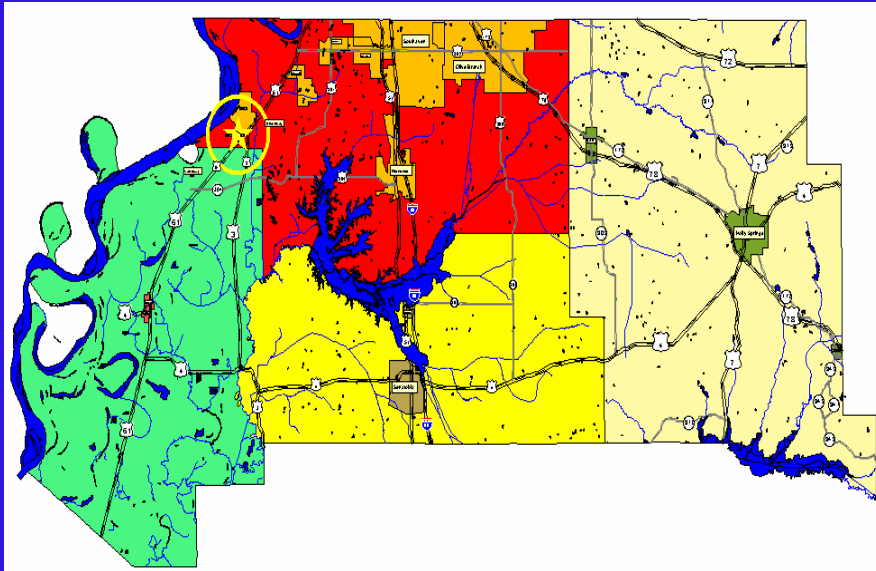
- Wave Pool
    - Lounge Pool
    - Kid's Area
    - Gift Shop

- 7.4 Acre Parking Lot

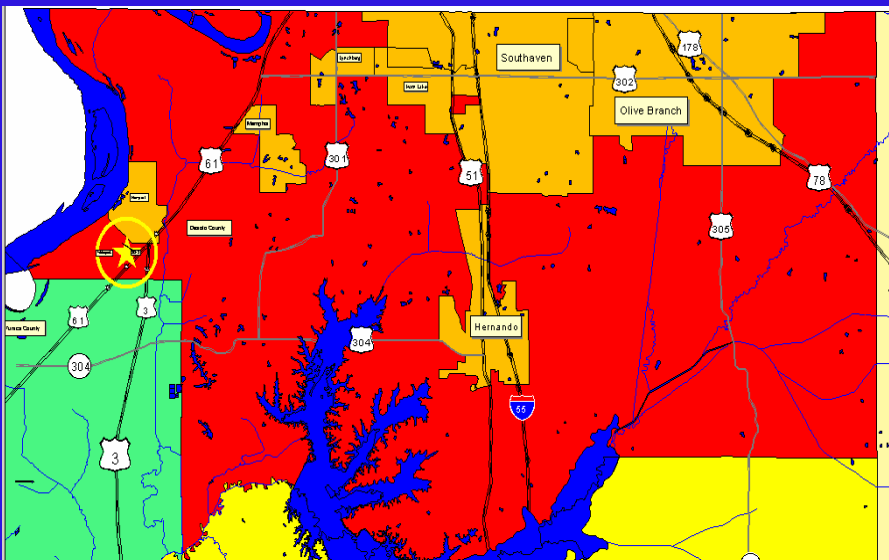
## Site Selection

| Parameter                     | Desoto County | Tunica County | Lee County |
|-------------------------------|---------------|---------------|------------|
| Population                    | 114,352       | 9,365         | 76,680     |
| Population Percent Change     | 6.7 %         | 1.5 %         | 1.2 %      |
| Population Under 18 Years Old | 28.2 %        | 31.5 %        | 27.7 %     |

# Location of Site



# Location of Site



## Selected Site



## Site Layout

- 3D Studio Max of Desoto County Including Site

## Environmental Considerations

- Rainfall Runoff
  - Combined Runoff Coefficient - 0.4
  - Total Discharge for Water Park - 16 cfs
    - 5-Year Flood
    - Intensity of 1.6 Inches per Hour
- Water Capacity for Rides
  - 5 Rides of 530 Gallons per Minute
  - 2 Rides of 660 Gallons per Minute
  - 3,970 Gallons per Minute Needed for Rides



## Transportation Considerations

- Parking Lot
  - 1,500 Parking Spaces
  - 25 Handicap Parking Spaces
  - 10 Bus Parking Spaces
- Intersection Entering Park

# Transportation

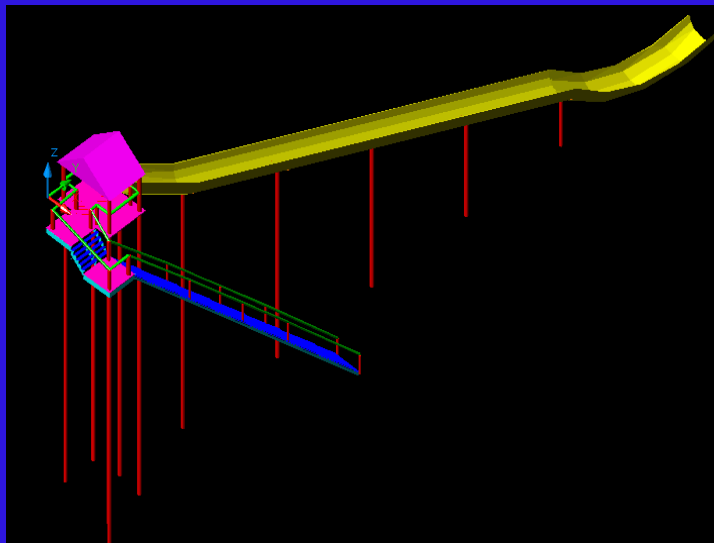


# Traffic Light

## Design Parameters

- Loads
  - LRFD Design
  - Dead
  - Live
  - Wind
  - Earthquake
  - Ice
- Columns
  - Steel
  - Pipes
- Flumes
  - Fiberglass
- Footings
  - Concrete
  - Square
  - Centrally Loaded

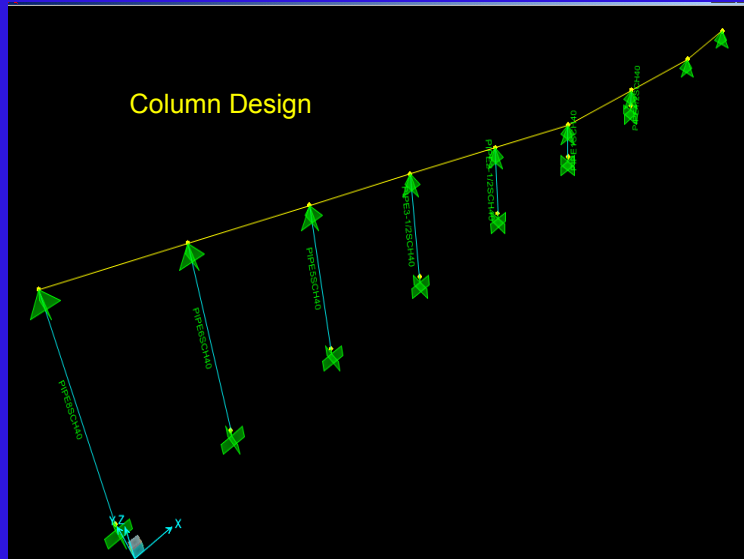
## Design Slide



## **Columns Spreadsheet**

## **Foundation Spreadsheet**

# SAP 2000 Model



# Thrill Ride

- 3D Studio Max

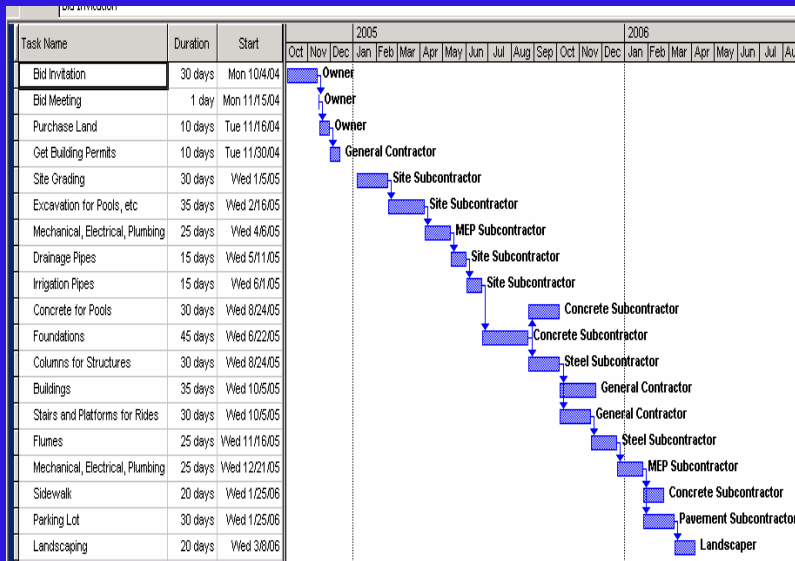
# Long Winding Slide

- 3D Studio Max

## Cost

| SPREADSHEET REPORT             |       |          |                  |              |  |
|--------------------------------|-------|----------|------------------|--------------|--|
| Water Park Cost Analysis       |       |          |                  |              |  |
| Item/Job Description           | Unit  | Quantity | Median Cost/Unit | Total Amount |  |
| <b>Land Acquisition</b>        |       |          |                  |              |  |
| DeSoto County                  | Acre  | 70       | 9000             | 630000       |  |
| <b>Construction Facilities</b> |       |          |                  |              |  |
| Trailer                        | Month | 15       | 194.03           | 2910.45      |  |
| Contingency                    |       |          |                  | 436.5675     |  |
| ▶ Total                        |       |          |                  | 3347.0175    |  |
| <b>Field Office Expenses</b>   |       |          |                  |              |  |
| Office Equipment & Supplies    | Month | 15       | 382              | 5730         |  |
| Contingency                    |       |          |                  | 869.5        |  |
| ▶ Total                        |       |          |                  | 6699.5       |  |
| <b>Site Work</b>               |       |          |                  |              |  |
| Excavation                     |       |          |                  |              |  |
| Dozer                          | CY    | 14000    | 3.37             | 47190        |  |
| Contingency                    |       |          |                  | 7077         |  |
| ▶ Total                        |       |          |                  | 54267        |  |
| <b>Landscaping</b>             |       |          |                  |              |  |
| Sod                            | SY    | 180000   | 2                | 360000       |  |
| Trees                          |       | 300      | 1000             | 300000       |  |
| Shrubs                         |       | 2500     | 15               | 37500        |  |
| Irrigation                     |       |          |                  | 60000        |  |
| Contingency                    |       |          |                  | 112125       |  |
| ▶ Total                        |       |          |                  | 859625       |  |
| <b>Water Slides</b>            |       |          |                  |              |  |
| Foundation Work                |       |          |                  |              |  |
| Concrete                       | CY    | 1500     | 130              | 195000       |  |
| Steel Reinforcement            | TON   | 900      | 1000             | 900000       |  |
| 48" Fiber Glass Tubing         | LF    | 6000     | 200              | 1200000      |  |
| 57" Fiber Glass Tubing         | LF    | 1200     | 400              | 480000       |  |
| Structural Steel               | LF    | 3500     | 80               | 280000       |  |
| Pipe                           |       |          |                  |              |  |
| 8" Schedule 80 PVC Pipe        | LF    | 15000    | 16.25            | 243750       |  |
| 12" Schedule 80 PVC Pipe       | LF    | 7000     | 18.35            | 128450       |  |
| Pumps                          |       | 5        | 8000             | 40000        |  |
| Contingency                    |       |          |                  | 520080       |  |
| ▶ Total                        |       |          |                  | 3987280      |  |

# Schedule



# Conclusion

- Great Location in Desoto County and in Close Proximity to Memphis and Tunica.
- Adventure and Fun for all Ages.
- Easily Accessible from All Major Roads.
- Simple and Safe Design.
- Similar Cost to other Parks, thus Similar Rates.

**Thank You**



**QUESTIONS???**