Cemetery Restoration
The Impact of GIS on Jewish Graceland Cemetery
Chicago Illinois

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Presentation Overview

- Cemetery background
- Key issues to resolve
- Data collection
- Methodology
- Conclusions
- Questions
Cemetery Background

- Has burials dating back 180 years since 1840
- Land is approximately two and a half acres (10117 meter$^2$)
- Contains 2,300 burials with 1,400 monuments and tombstones
- No reliable record keeping methods, unorganized paperwork
Cemetery Background

- Cemetery has been neglected for 20 years since 1991
- Wild brush, litter, and monument abuse have ravaged the cemetery
- Fallen trees contributed greatly to damage
- Wild trees have disturbed landscape
The Main Question

- What tool can help cemetery personnel spatially identify potential defective tree impacts against tombstones and provide asset information?

- Answer: GIS
Key Issues to Resolve

- Generate priority list for potential tree hazards (today’s presentation)
- Create inventory
  - trees, burial lots, monuments & tombstones
- Organize cleanup of grounds and identify destroyed tombstone monuments
Limitations for Cemetery Restoration

- Money, Money, Money

- Based on geographic analysis, which trees are given priority for removal based on potential impact

- Organize cleanup based on financial limitations
Data Collection: Build Base Data

- GPS used to collect tombstone points and monument locations
  - Height -- Condition
  - Age -- Material

- GPS used for tree locations
  - Bole -- Canopy width
  - Height -- Tree Health
  - Diameter Breast Height
Data Collection: Tree Health

- Tree inspected for
  - Root problems
  - Lean angle
  - Crown architecture
  - Wounds
  - Cracks
  - Decay
Tree Rating System for Analysis

- Adopted the U.S. Forest Service Hazard Tree Rating Method

- Tree Hazard Rating Score =
  - Potential for Failure + Potential for Damage
    (Score 1-4)    (Score 1-4)

- i.e. A total rating score of 7 between both categories equals high treatment priority
Methodologies: Process 1: Tree Representations

- Created lines to represent height and direction of tree tilt
- Lines that represent bole
- Generate polygons for crown region
Methodologies: Process 2: Model Builder Flow

- Proximity tools used
  - Buffer on canopy radius field

- Overlay tools used
  - Erase to generate canopy impact area
  - Intersect to create canopy overlap

- Extract tools used
  - Select paths >= 7 hazard score high
  - Select tombstones within these areas
Methodologies:
Process 3: Analysis Segment 1

Step 1: Identify tree paths and lean angles
Methodologies: Process 3: Analysis Segment 2

Step 2: Identify tree canopy overlap using Intersect
Methodologies:
Process 3: Analysis Segment 3

Step 3: Identify canopy areas using Buffer and Erase tools
Step 4: Identify crown regions with high hazard score.
Overview of 15 Selected Trees

- 3 trees had cracks
- 7 trees had decay and root issues
- 4 trees had severe lean
- 1 tree had severe lean and decay due to insect impact (Tree 25)
Methodologies: Process 3: Analysis Segment 5

Step 5: Identify tombstones and monuments at risk
Financial Impact Overview

- Historical repair estimates
- Franks and Marks monuments costly due to size
Conclusion

- Historical overview of Jewish Graceland
- Base data creation
- Geoprocessing methods
- Tree 25 priority selected
GIS is a Grand Slam! It is a tool that will only enhance future restoration and maintenance methods for the cemetery in years to come.
Questions??

- A huge **Thank You** for attending!
- Any Questions that I can answer for you!