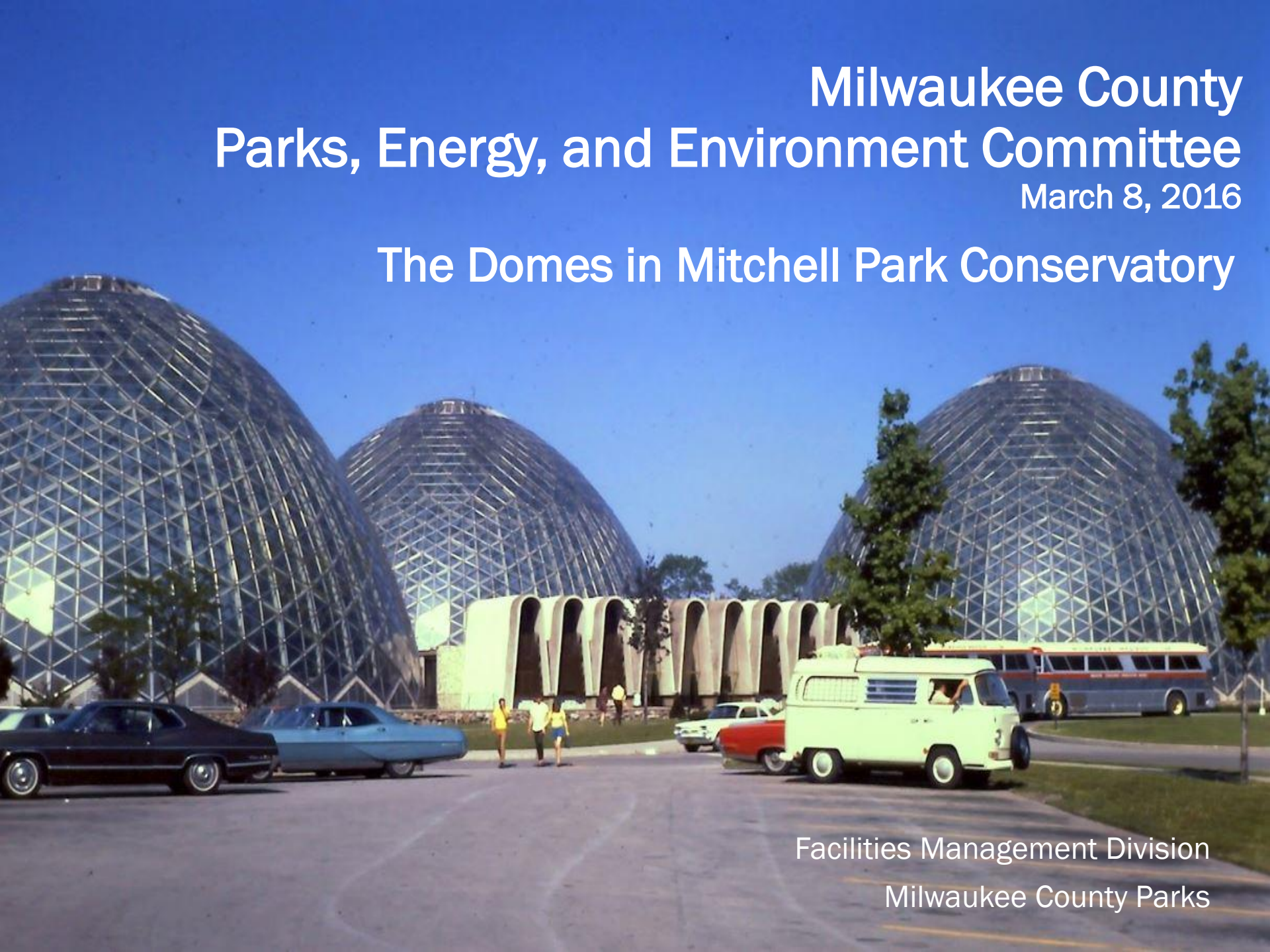
Milwaukee County
Parks, Energy, and Environment Committee
March 8, 2016

The Domes in Mitchell Park Conservatory



Facilities Management Division

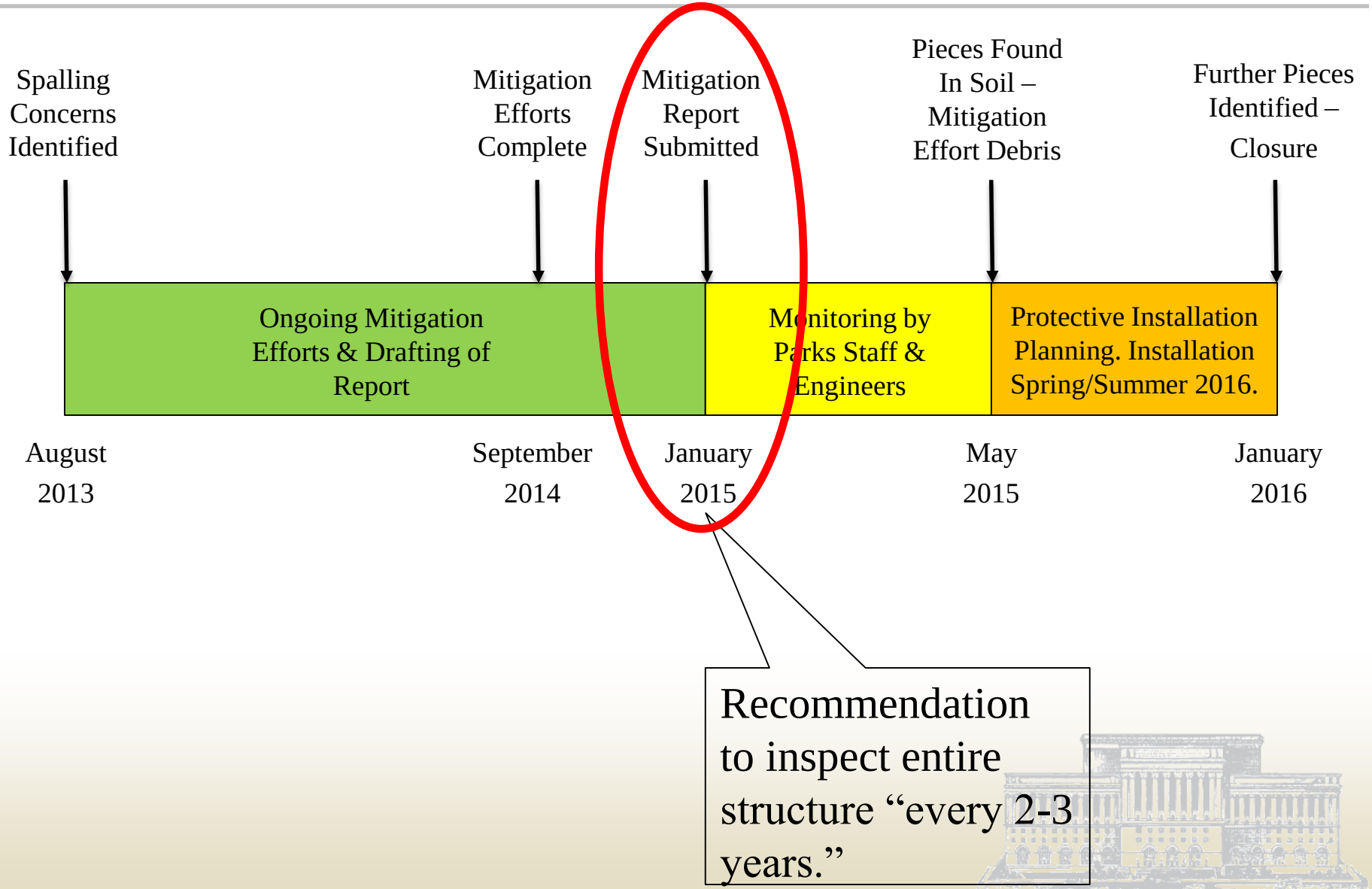
Milwaukee County Parks

File 16-220: Mitchell Park Domes

Agenda

- 2015-2016 Timeline Review
- Short Term Solution for Show Dome
- Updated Cost Estimates
- Arid & Tropical Dome Next Steps
- Overarching Challenges with Domes
- Long Term Plan

Recent Timeline: Overview



2015 Report Condition Photos

BROKEN GLASS

Photo F11: BROKEN GLASS LETS IN AIR AND MOISTURE.

2015 Report Condition Photos

Photo F12: WATER DIVERTER INSTALLED BELOW HUB.

2015 Report Condition Photos

Photo Taken Prior to Mitigation Efforts

CONCRETE DETERIORATION AT EMBEDS

Typical for ~40% of Connections

Photo F01: VISIBLE CONCRETE CRACKING AT CONNECTION OF GLAZING STANDOFF PIPE TO STRUCTURAL SPACE FRAME.

2015 Report Condition Photos

Photo Taken <u>During</u> Mitigation Efforts

Typical for ~40% of Connections

Photo F02: DELAMINATED CONCRETE WAS KNOCKED LOOSE. EXPOSED EDGES OF THE RUSTY STEEL PLATE WERE LATER PAINTED WITH GRAY ZINC-RICH SPRAY PAINT. REMOVING THE CONCRETE PICTURED IN THE PREVIOUS PHOTO ELIMINATES A POTENTIAL FALLING HAZARD.

2015 Report Condition Photos

Photo Taken Prior to Mitigation Efforts

MISALIGNMENT BETWEEN GLAZING STANDOFF PIPE AND CONCRETE EMBED PLATE

Photo F03: MISALIGNED CONNECTION LEAVES GAP WHERE WELD CANNNOT BE MADE ALONG THE BOTTOM EDGE OF PLATE.

Occurrences

- 4 Tropical
- 1 Arid
- 0 Show

2015 Report Condition Photos

Photo Taken After Mitigation Efforts

Occurrences
- **4 Tropical**
- **1 Arid**
- **0 Show**

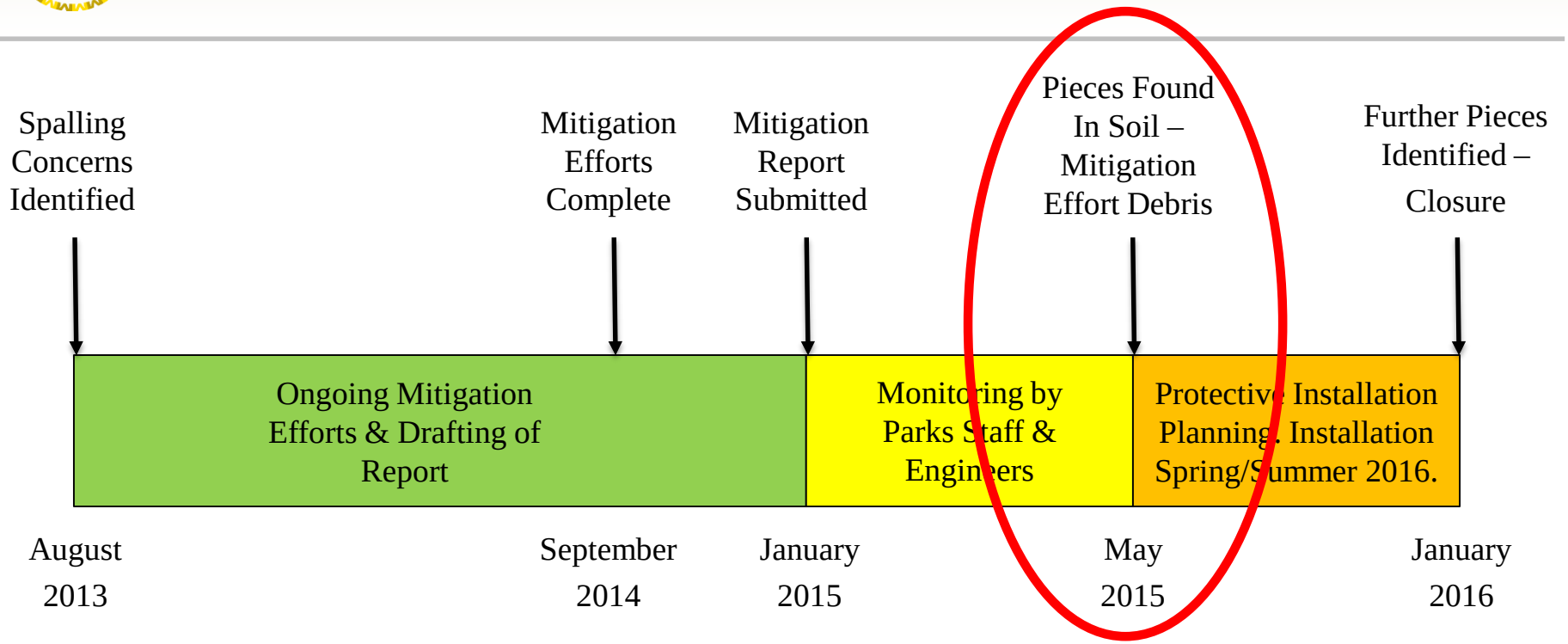
Photo F04: STAINLESS STEEL CLAMPS PULL MISALIGNED CONNECTIONS TIGHT TO SUPPORTING REINFORCED CONCRETE STRUCTURE.

2015 Report Condition Photos

Photo Taken <u>After</u> Mitigation Efforts

Photo F07: REMOVAL OF GROUT MAKES ROOM FOR NEW GROUT REPAIR. CONNECTION PLATE EXHIBITS SOME RUST.

Recent Timeline: May 2015



May 2015

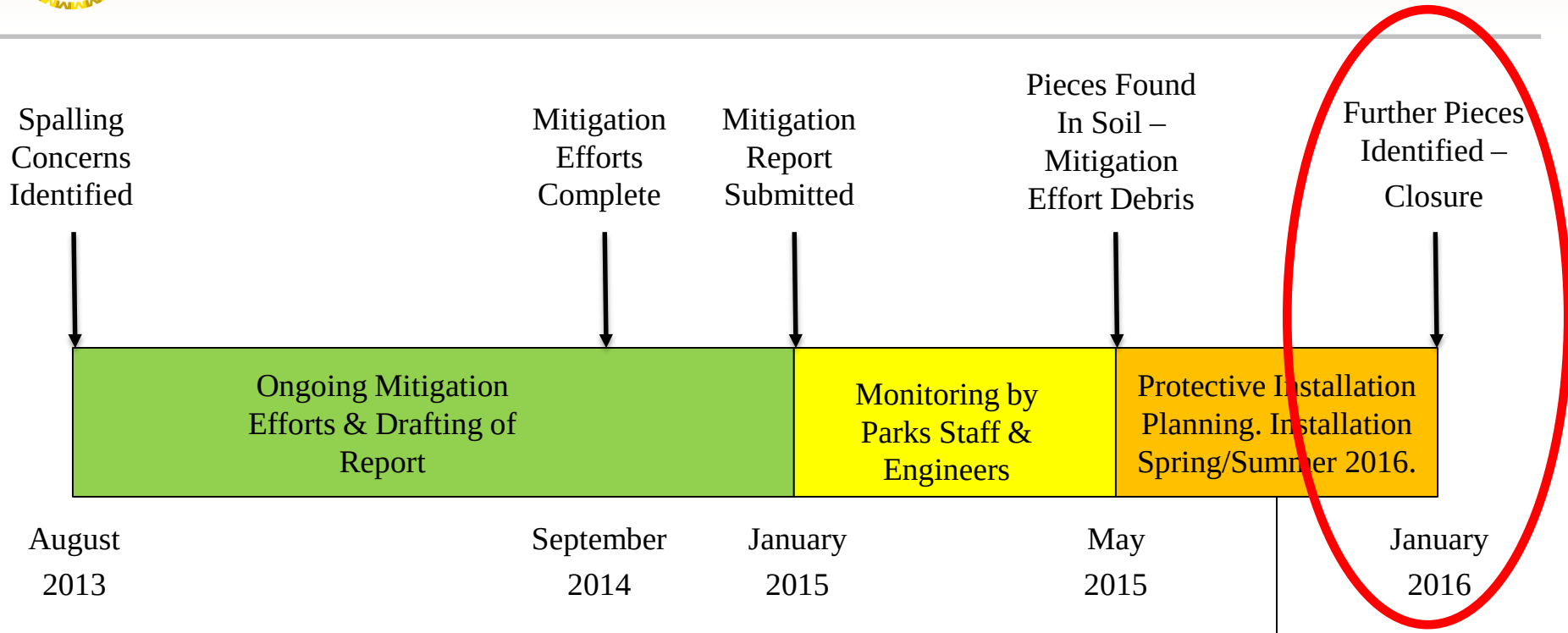
Concrete Pieces Identified in Soil

- Appeared to be from mitigation project, but that short / medium / long term plans must be initiated.

Three Plans Initiated:

1. Extensive Monitoring & Logging
2. Netting Project Development
3. Public Long Range Planning Process for Repair or Replacement Options

Recent Timeline: 2015 Funding



2015 Funding Rec'd

Netting P&D

Long Range Plan Development

Jan. 2016: Recommendation to Close

Situation

- Engineering team on site for netting mock up meeting in January 2016
- Further spalled concrete identified in January.

Action Taken:

- Consultant Engineers, Risk Management, FMD, Parks, Exec's Office, and Budget met to discuss situation
- **Concurrence that with unknown source of larger piece and signs of continued spalling, despite mitigation efforts in 2014, only logical answer to close effective immediately.**

Spalling Protection Options

1. Covered Pathways
   - Doesn't protect staff and greatly lessens 'Domes experience'

2. Netting/Mesh on Inside of Structure
   - Initially challenged due to aesthetics
   - Better aesthetic solution identified recently
   - Benefits related to simplicity & all encompassing protection

3. Netting/Mesh at Connections 5,100 Connections
   - Initially viewed as top solution.
   - Incredibly expensive
   - Highly volatile pricing due to time required.
   - Simply assuming $300 per connection = $1.5M

Prerequisites of Spalling Protection

- ½” or smaller opening size
- Flame Resistant
- Mold/Mildew Resistant
- Drains Water

Criteria for Objective Review

- Staff areas protected as well as pedestrian paths
- Cost
- Duration to install
- Availability
- Lifespan (5 yr min – up to 10+)
- Visually appealing
- Impact on future inspection
- Impact on plants
- Impact on visitor experience
- Vegetation/habitat modification requirements

Objective Review

Criteria	Importance Rating	Metal Mesh Options			Poly Netting Options*		Canopy Over Walkways
		Wrap Joints SS 1/2" Hex	Interior Face SS 1/2" Hex	Interior Face Galv 1/4" Square	Wrap Joints 1/4" White	Interior Face 1/4" White	
Cost	5	1	2	2	1	3	3
Duration of Installation per Dome	3	2	3	3	2	3	1
Availability	1	2	2	3	1	1	2
Lifespan (5 yr min - up to 10+)	4	3	3	1	2	2	3
Visually appealing	2	3	3	2	3	1	1
Impact on future inspection	5	2	2	2	1	2	1
Impact on Plants	4	3	3	2	3	1	1
Impact on Visitor Experience	5	3	3	3	3	3	1
Protect Staff Area	5	3	3	3	3	3	1
Vegetation/Habitat Modification	4	3	3	3	3	3	1
Maximum Possible Points:	114	95	103	90	85	91	57
Minimum Possible Points:	38						
Approx Cost for Show Dome		$301,000	$266,000	$239,000	$276,000	$231,000	$283,000

*** Poly will not allow Show Dome to open in May due to lead time**

Red indicates an unacceptable condition

Cost Update – Interior Netting

Project Cost	½" SS Hex Mesh
Show Dome	$266K
Tropical Dome*	$TBD
Arid Dome*	$TBD
Spalling Protection (Three Domes)	**$266K + Arid/Tropical Domes**
Updated 2008 Estimates	$30K
Pre-Award Long Range Plan Support	$50K
Long Range Planning RFP	$100K
Graef Engineering Support	$100K
AE&ES Project Management	$85K
Short & Long Term Soft Costs	**$365K**
Current Total	**$631K + Arid/Tropical Domes**

Recommend approving resolution and $500K.

* Return in May with better cost analysis for Arid and Tropical Domes.

Picture of Interior Netting - Distance

Arid / Tropical Dome Plan

- Use lessons learned in Show Dome for efficiencies and cost control
- **Arid and Tropical Domes have highly variable schedule based on:**
  - **Lift Availability**
  - **Material Availability**
  - **Personnel Availability & Concurrent Work Options**
  - **Acquisition Plan**
- Specialized lift required to access concrete frame…

Specialized Lift (Tropical and Arid)

Specialized Lift (Tropical and Arid)

Specialized Lift (Tropical and Arid)

Next Steps for Short Term Solutions

- Priority 1: Show Dome Opening
- Priority 2: Scope Development for Arid and Tropical
- Priority 3: Award work on Arid and Tropical Dome
- Timeline for Arid and Tropical Domes?
  - Too many variables to answer at this time.
  - 10-20 weeks per Dome
  - Material lead times vs. costs of more expensive materials
    - $1/SF lead time possibly 3-4 months
    - $4/SF lead time TBD
  - Concurrent work options based on lift availability

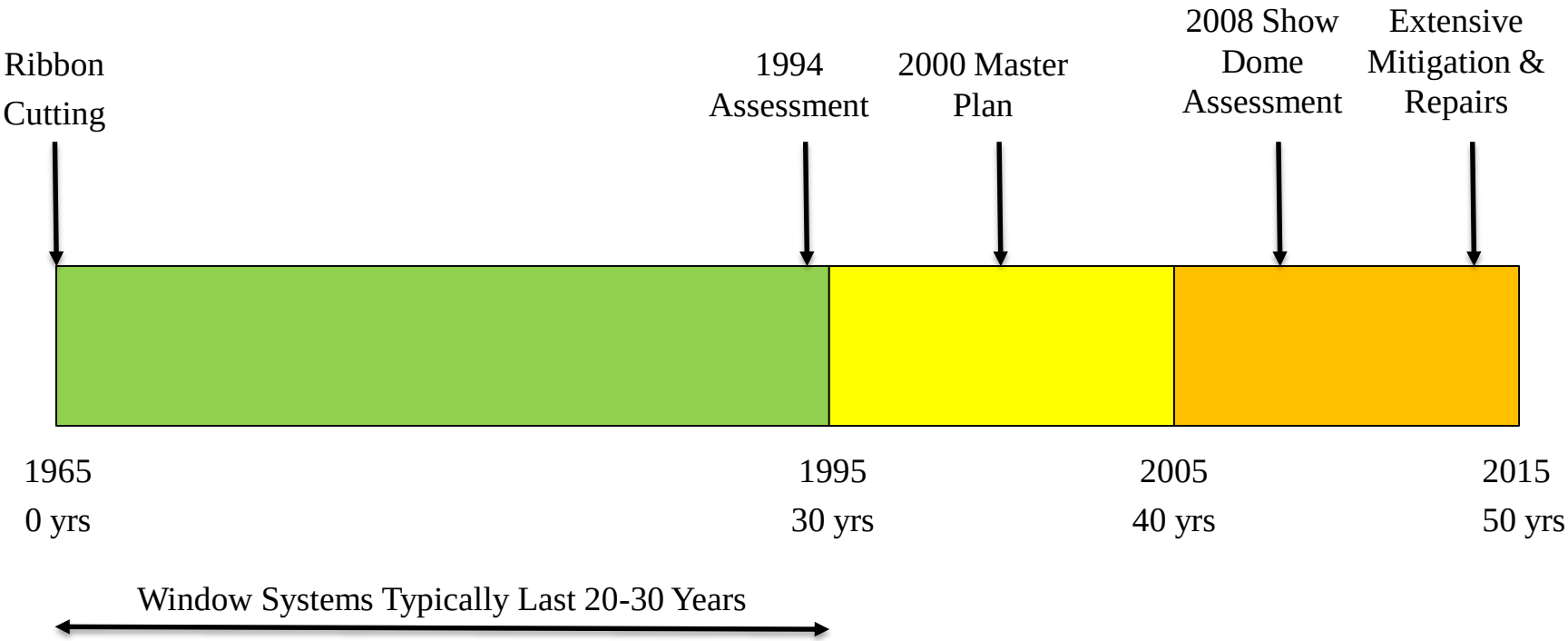
Long Term Solutions Needed

None of the short term solutions greatly extend the serviceable life of the Domes.

Ongoing challenges will persist…

We have an opportunity we need to seize.

Domes Engineering Timeline



1994 to Current: Until the water infiltration is stopped, the Domes will continue to deteriorate.

Challenges with Domes Design & Use

1. Inability to affordably access interior or exterior above 20'.
   - Exterior typically requires crane for each maintenance action.
   - In 2013, located specialized lift to access Arid & Tropical Dome interiors.
   - Few economies of scale due to unique requirements for repair.
2. ~9,400 Windows
   - Each cut to size when replaced.
   - Due to racking/settling, every piece should be verified off site prior to install.
3. ~5,100 Hub Connections (aluminum to concrete frame)
   - Each a point of potential corrosion and spalling due to steel baseplate.
4. Internal Drainage System internal to aluminum framing
   - Clogged throughout structure and virtually inaccessible due to #1.
   - Tropical Dome constantly dripping inside due to backup in clogged drains.
5. Ensuring plant life maintained throughout repairs
   - Particularly challenging in Arid and Tropical Domes.
   - Must be trimmed back by staff to access interior walls.

What's Next?

Our Public Process Framework

- *Phase 1: Community Engagement & Research*
- *Phase 2: Conservatory Plan Development*
- *Phase 3: Conservatory Plan Presentation and Approvals*

Our plan is to preserve and protect the Conservatory's legacy through a robust community planning process with active public involvement and ongoing respect for the history and unique heritage of the Mitchell Park Horticultural Conservatory.

What's Next?

Phase 1: Community Engagement & Research (3 months)

- *Form a Conservatory Steering Committee*
- *Review materials, plans, reports, studies*
- *Assess conservatory programs, funding and structure*
- *Engage stakeholders and the community at large*
- *Identify options and make recommendations*
- *Answer "What is the long range plan for the Conservatory Domes?"*
- *Prepare a Scope (RFP/RFQ) for Conservatory Master Plan process (Phase 2)*

Planning for the Future

- *Which options are on the table?*
  - *Repair the Domes?*
  - *Complete Restoration of the Domes?*
  - *Rebuild the Conservatory Domes?*
  - *Envision a new future of the Mitchell Park Conservatory?*
- *We are committed to engaging with the public in a long-term planning process that is transparent and comprehensive*

What's Next?

Conservatory Steering Committee

- *Horticultural Services Manager, Department of Parks, Recreation and Culture*
- *President, Friends of the Domes*
- *Representative, Clarke Square Neighborhood Initiative*
- *Representative, Potawatomi Bingo and Casino*
- *Representative, Journey House*
- *Representative, MPS, Department of Business, Community and Family Partnerships*
- *Representative, Visit Milwaukee*
- *Representative, Newaukee*
- *Representative, Zilber Foundation*
- *Representative, Brewers Foundation*
- *Representative, Horticultural Practitioner*
- *Representative, Historical Preservation Group*
- *Milwaukee County resident*
- *Consultant*

What's Next?

Phase 2: Conservatory Plan Development (3-6 months)

- *Public information and Public Workshop meetings*
- *Draft Conservatory Master Plan*
- *Detailed analysis and Projected costs*
- *Presentations of the draft plan*
- *Follow-up interviews and meetings*

What's Next?

Phase 3: Conservatory Plan Presentation and Approvals (3 months)

- *Final Conservatory Plan, including implementation plan*
- *Presentations to Steering Committee, County Executive and staff, and County Board of Supervisors*

Phase 4: (contingent item) development of design, bid, build contract documents

Milwaukee County
Parks, Energy, and Environment Committee

March 8, 2016

The Domes in Mitchell Park Conservatory

http://county.milwaukee.gov/Domes