

# Facilities Overview

Skip Vaughn

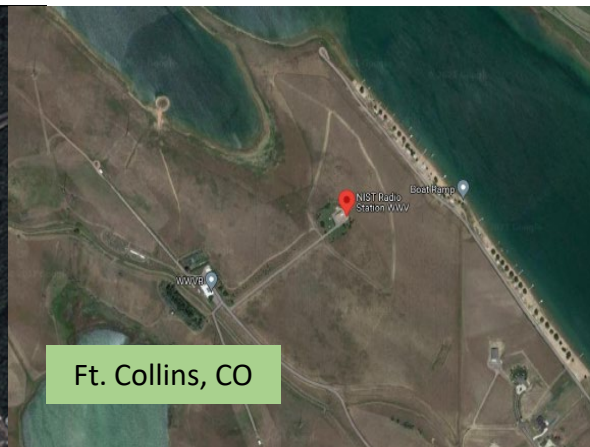
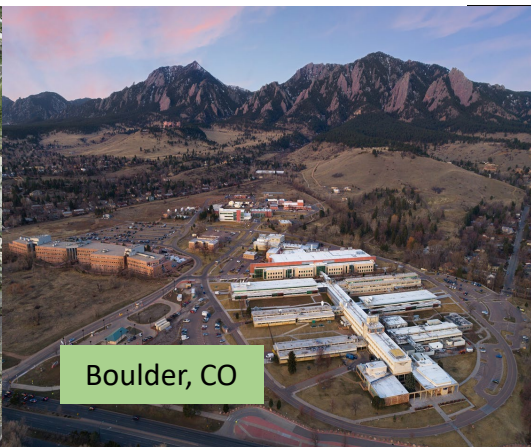
Director,

Office of Facilities & Property Management

# NIST Facilities Overview



- Over 1,300 acres across 5 sites
- 98 buildings & structures totaling over 4.6 Million Gross Square Feet
- The overall condition of buildings on the NIST Gaithersburg campus reached critical in 2018
- NIST has approximately \$1.1B in deferred maintenance and needs \$95M for enterprise IT infrastructure



## Bottom Line Up Front

(from NASEM Presentation)

**Finding 3-4:** NIST facilities are not world class and are therefore a growing impediment against attracting and retaining staff in a highly competitive STEM environment. Moreover, the longstanding facilities problems have created a culture of workarounds by scientific staff that distracts from R&D efforts.

Based on the laboratory tours and discussions with researchers, the committee estimates overall technical staff productivity losses of 10%-40% due to rework, repairs, and workaround efforts by the researchers.

**Recommendation 4-5:** OFPM's entire NIST Coordinated Recovery Plan, both the Sub-Plan for Recapitalization (CMR-funded) and the Sub-Plan for Stabilization (SCMMR funded) should be approved and fully funded beginning in FY 2023, subject to continuing refinement.

### Coordinated Recovery Plan Funding Recommendation:

Funding Category	Annual Funding Level
Construction and Major Renovations (CMR)	\$300M - \$400M
Safety, Capacity, Maintenance & Major Repairs (SCMMR)	\$120M - \$150M
Total Annual Funding (12 years & then reassess)	\$420M - \$550M

# Coordinated Recovery Plan



No.	Project Description	FY23		FY24				FY25				FY26				FY27				FY28				FY29				FY30				FY31				FY32				FY33				FY34				FY35				FY36			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4												
1	Bldg. 245 Modernization							\$																																															
2	Bldg. 3 Addition							\$																																															
3	Bldg. 228 (New CN)																																																						
4	Bldg. 101 Renovation & Addition																																																						
5	Bldg. 222 Renovation & Addition																																																						
6	Research Building "B" (New CN)																																																						
7	Research Building "A" & Parking Garage																																																						
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10	Bldg. 223 Renovation																																																						
11	MR Bldg., CCC & Upper Campus (New CN)																																																						
	Gate A																																																						
	Gate F																																																						
	CUP (G) Modernization & Expansion																																																						
	(G) Underground Utilities Replacement																																																						

	Program of Requirements Phase
	Procurement Phase
	Design-Build or Construction Phase
	Outfitting & Moves Phase

# Inspector General Determination



1. Prioritizing complex construction and maintenance projects
2. Ensuring prudent financial management and oversight of funds

- The NASEM study found that NIST's inadequate facilities cause delays in national security deliverables, damage to costly equipment, and productivity losses of up to 40%.
- NIST requires consistent, significant funding to execute multiple large construction and maintenance projects to rectify its facilities issues, which may take years to fix.
- NIST must ensure strong financial management and oversight of its funds while addressing the poor condition of its facilities. This includes fair awarding of construction contracts, monitoring of performance requirements, and accountability of contractors and subcontractors.
- The 12-year recovery plan allocates funds for construction and major renovations, safety, capacity, maintenance, and repairs.

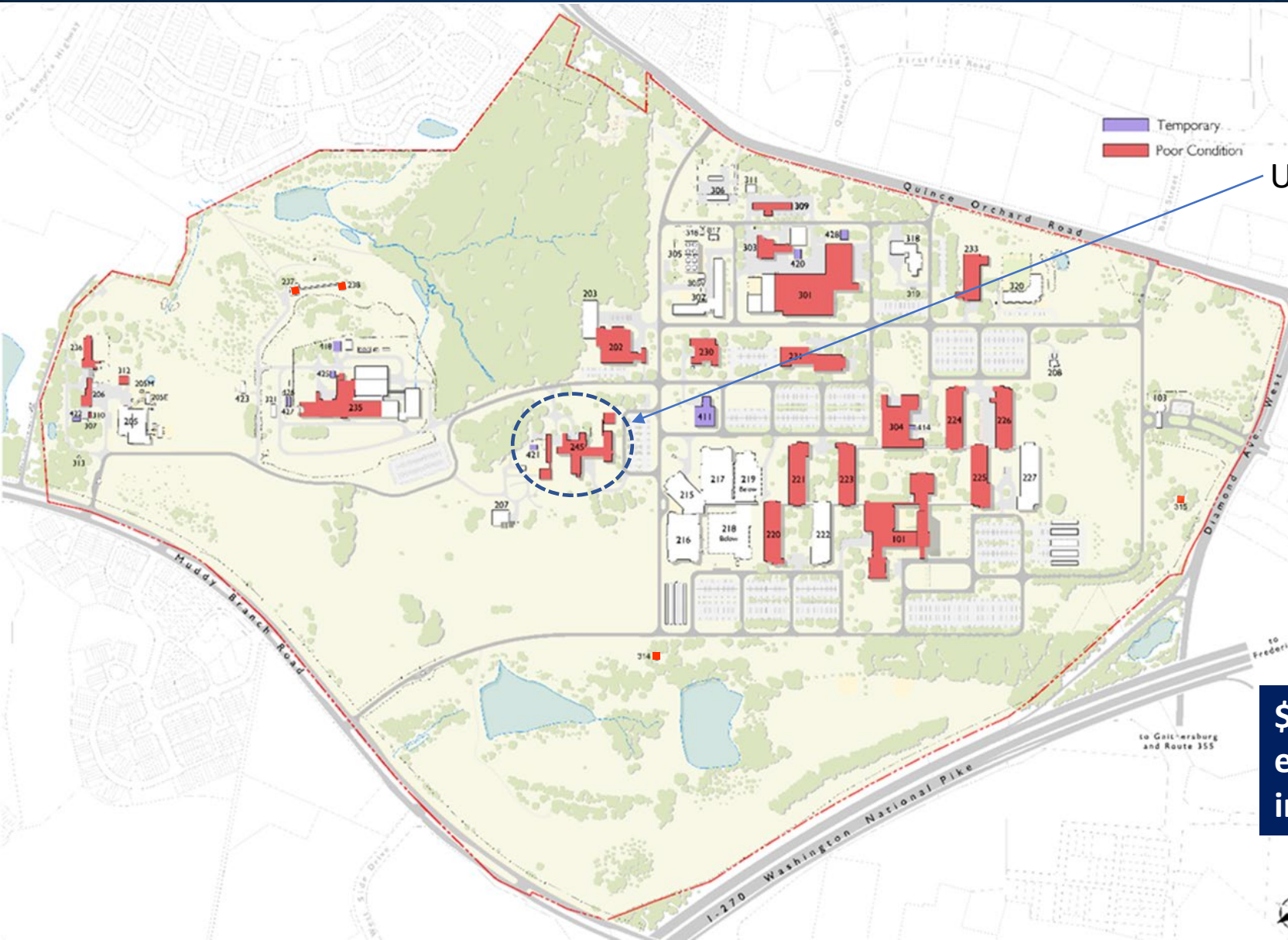
## Top Management and Performance Challenges Facing the Department of Commerce in Fiscal Year 2024

U.S. Department of Commerce  
Office of Inspector General

Report No. OIG-24-002  
October 12, 2023



# Summary of Problem



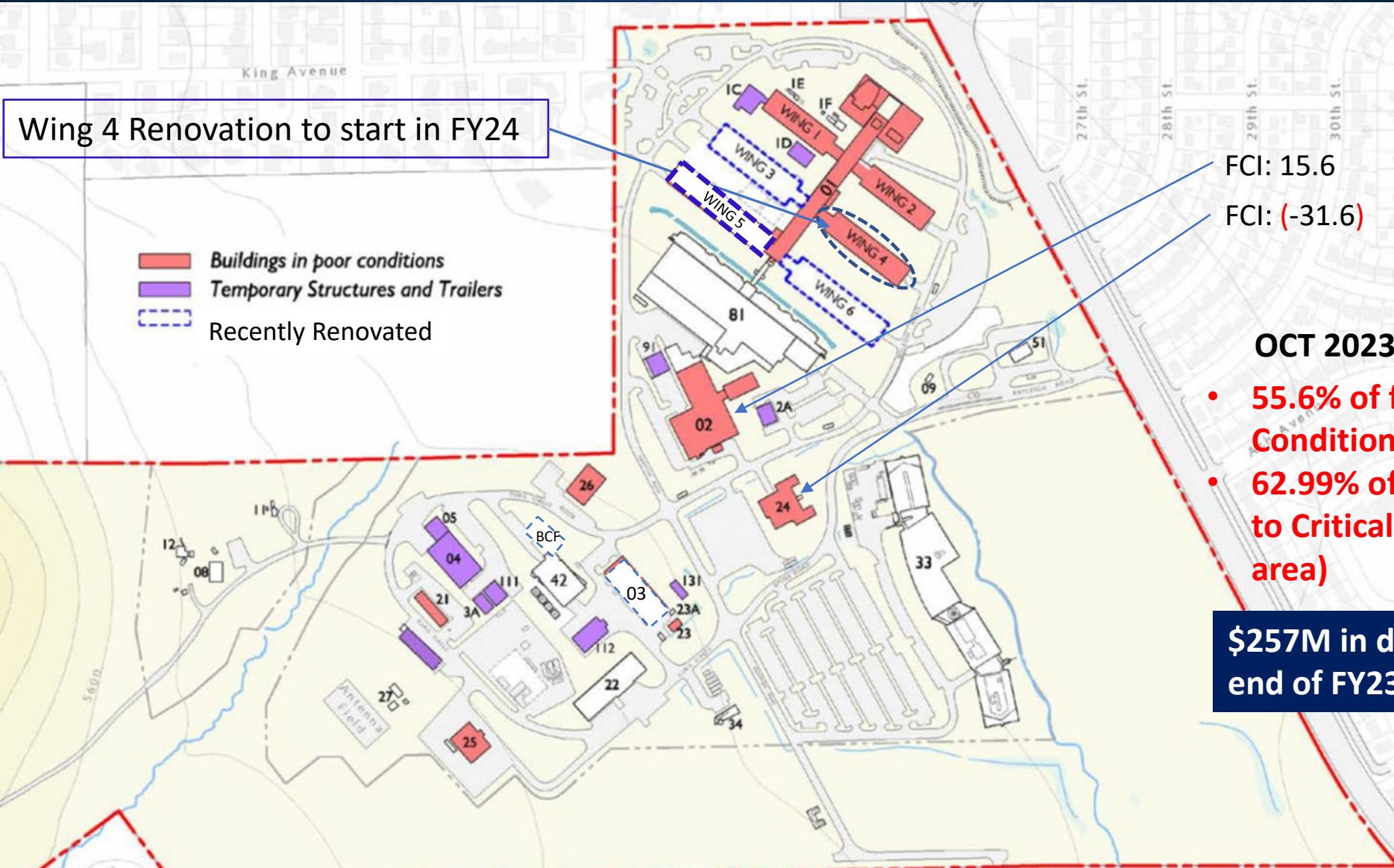
Under Renovation

## OCT 2023 Facilities Condition Report:

- **77.59% of facilities are in Poor to Critical Condition (by SF area)**
- **64.75% of research facilities are in Poor to Critical Condition (by SF area)**

**\$887M in deferred maintenance at the end of FY23 in Gaithersburg + ~\$95M in IT infrastructure replacements needed.**

# Summary of Problem



FCI: 15.6  
FCI: (-31.6)

### OCT 2023 Facilities Condition Report:

- 55.6% of facilities are in Poor to Critical Condition (by SF area)
- 62.99% of research facilities are in Poor to Critical Condition (by total building area)

**\$257M in deferred maintenance at the end of FY23 in Boulder**



## *U.S. Federal Research and Development Infrastructure*

*A Foundation of the Nation's Global Scientific Leadership and Economic and National Security*

May 2024

## U.S. Federal Research and Development Infrastructure

### Trends across federal research agencies:

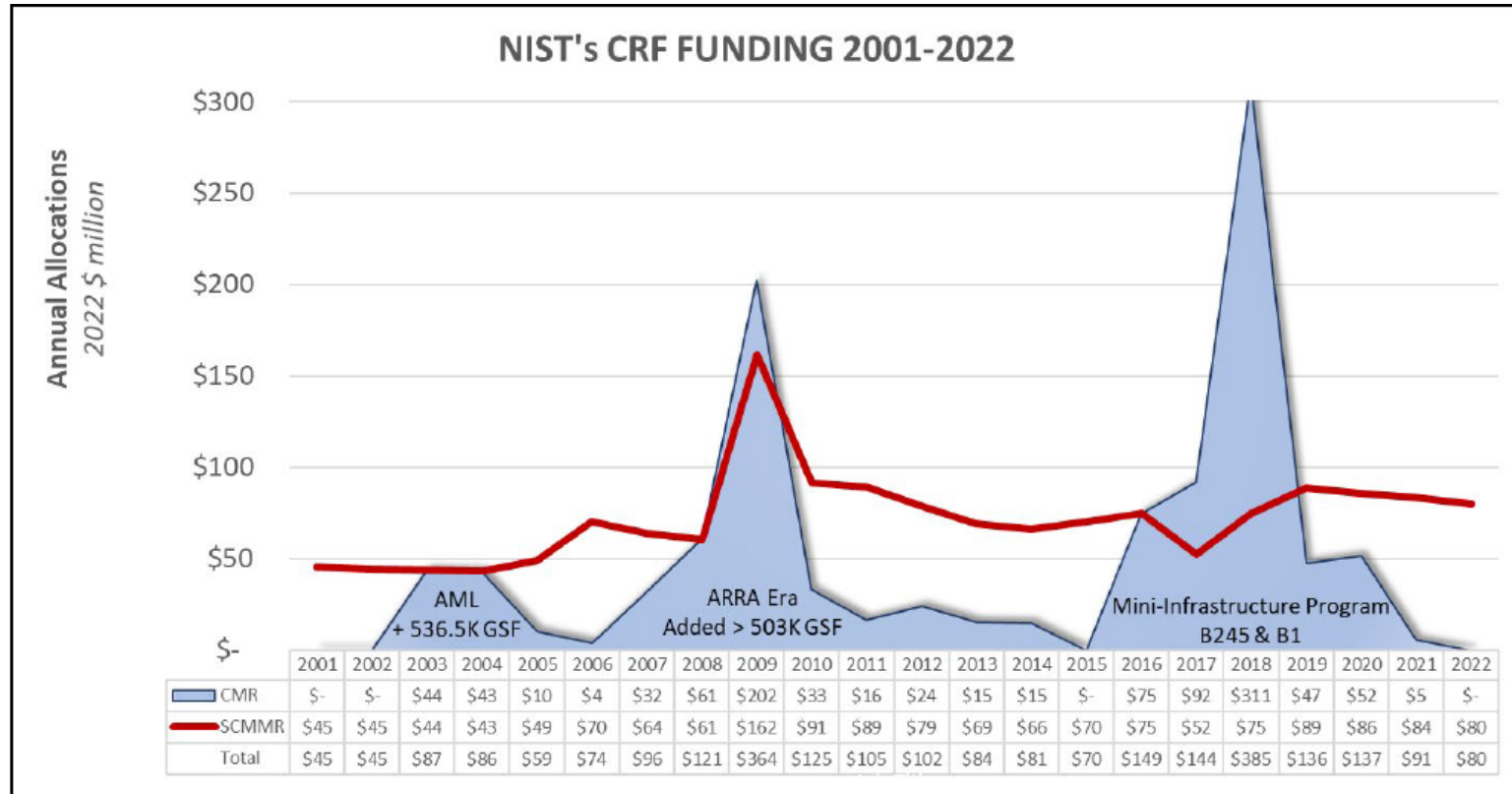
- Aging and Inadequate Research Infrastructure
- Cascading Impacts from Substandard Facilities
- Widening Gaps in Global Science and Technology Outcomes
- Challenges in Recruiting and Retaining Top Scientific and Engineering

### Agency actions that can be taken now:

- Strategic Planning
- Identification of Gaps
- Benchmarking International RDI and Identifying Collaborations
- Sharing RDI Strategies



# Funding History



**FIGURE 4-2** NIST’s 20-year CRF funding history converted to 2022 \$US.  
 SOURCES: Office of Facilities and Property Management and data from Construction Analytics, 2022, “Construction Inflation 2022,” Construction Analytics, Updated May 3, 2022, <https://edzarenski.com/2022/02/11/construction-inflation-2022>.

**Average Annual Funding level from 2013-2023: ~\$135M Total, ~\$68M for SCMMR**

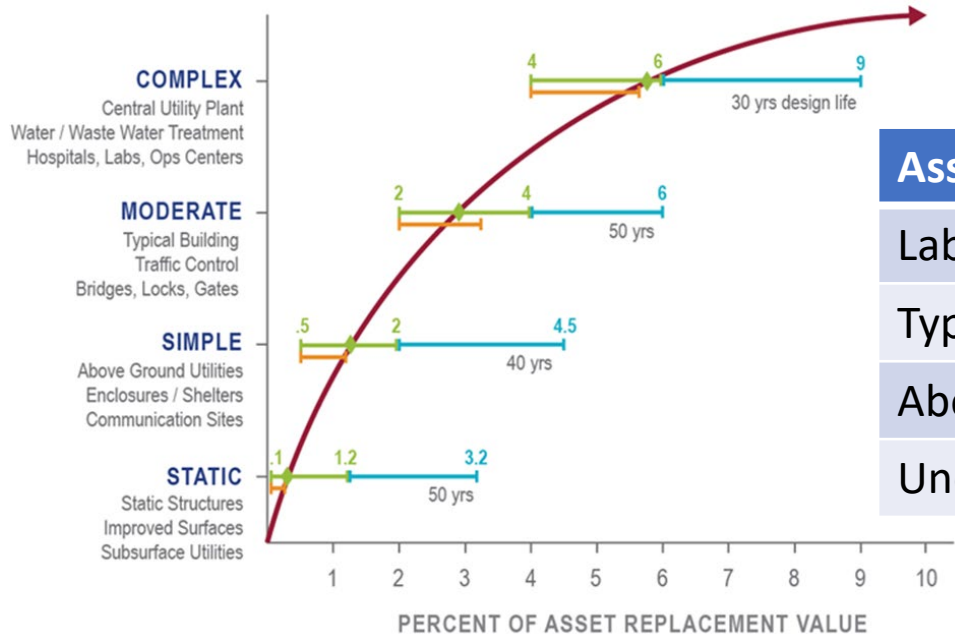
# Budget



Description	FY23	FY24	FY25 President's Budget
Annual Recurring Costs	\$61.7M	\$54.6M	\$70.0M
Construction & Major Renovations	\$0	\$0	\$178.3M
SCMMR Projects	\$68.3M	<b>\$33.2M</b>	\$63.2M
Construction Grants (Earmarks)	\$332.3M	\$80.2M	\$0
<b>TOTAL:</b>	<b>\$462.3M</b>	<b>\$168.0M</b>	<b>\$311.5M</b>

# Asset Mgmt. – Financial Planning

## ASSET OWNERSHIP INTENSITY INDEX



Asset Type Anticipated Design Life	NIST Average for original facilities
Labs, Central Utility Plants : 30 years	60-70+ years
Typical Building : 50 years	60-70+ years
Above Ground Utilities : 40 years	60+ years
Underground Utilities, Roads: 50 years	Gaithersburg: 60+ years

— Unscheduled Maintenance & Repair     — Component Renewal  
— Scheduled Maintenance & Repair     — Ownership Intensity Curve

**Take Away:** NIST is **WELL** beyond end of life renewal for a vast majority of its facilities.

# Mission Impacts due to Facilities Conditions NIST

## Impact Examples: (G) CUP Steam Strainer

Date: AUG 30, 2020

Cause: Porosity & lack of tensile strength in cast iron, corrosion due to age

Damage: 4" steam line, fitting, insulation, hangers, lights & platform

Impact: Lab program delayed deliverable to DOD, DHS & others. Forensic investigation identified need to replace entire steam system piping in this facility which will have numerous future impacts to researchers.



Credit: NIST



Credit: NIST



Credit: NIST

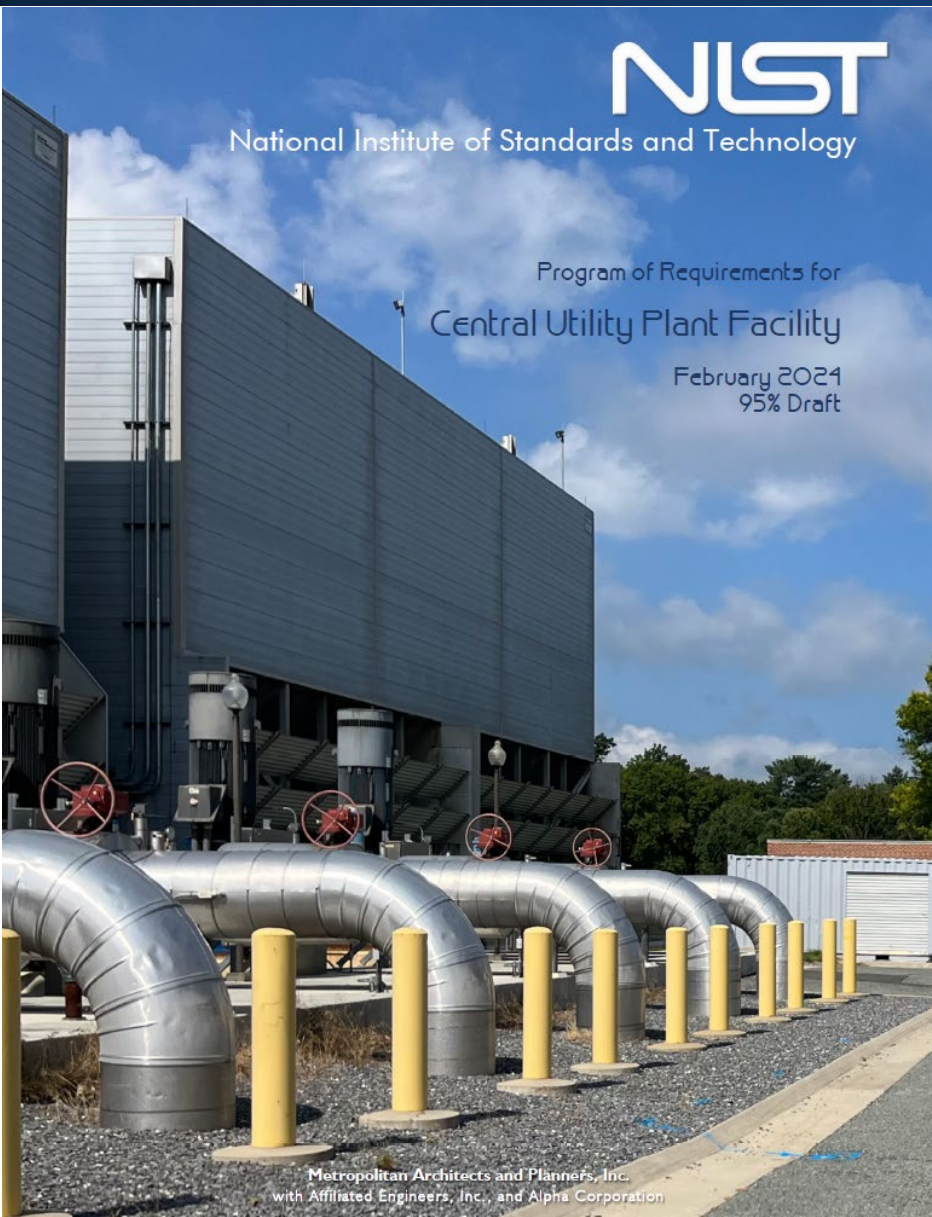
# Facilities Conditions – Underground Utilities **NIST**

## *Gaithersburg*

- Electrical:
    - System beyond useful life
    - Structural failures
    - Lack of capacity for expansion
  - Chilled Water:
    - Recurring breaks & Valve failures
  - Potable Water:
    - Recurring breaks & Valve failures
- Steam:
    - 50,000-70,000 gallons per day loss in system
    - Defective prior replacement work, exacerbating problems
  - All Systems:
    - Lack of redundancy
    - Lack of capacity for master plans



# Gaithersburg Campus Infrastructure



## **Central Utility Plant (CUP):**

- ~\$190M in FY24 (Add inflation @ ~6% per year)
- Phase 1 Award in FY25 (Amount TBD)
- Fund over 5 years (preferably less)

## **Underground Utility Infrastructure:**

- ~50 Miles of infrastructure
- Projected \$1B+
- 15% design complete, Award remaining design in AUG '24.
- DOC approved 12-year IDIQ approach
- Seed project award FY26

## **Note:**

- 1.) Both are needed for maintaining campus utility distribution
- 2.) Both are required to support future major projects on campus

# 5-Year SCMMR Priorities (Other)



Description	Low (FY25\$)	High (FY25\$)
Utility Infrastructure (bldg.'s)	\$180M	\$195M
Roofs/Life-Safety/Safety	\$75M	\$105M
Bldg. 101 Complex	\$20M	\$25M
Master Plan	\$18M	\$20M
Other/Misc.*	\$115M	\$130M
TOTAL:	\$408M	\$475M

\*: 2/3 is for roads & parking lots.

**Annual Funding for Projects:** \$82M - \$95M (doesn't include funding for CUP or campus utilities)

With annual costs included, exceeds \$130M NASEM high end recommendation of \$130M/yr.

**Note:** Boulder Wildfire Mitigation costs are **NOT** included in values above.

# Strategic Approach to Funding

Overview of NIST Construction Projects					NIST
Project Information				Strategic Alignment	
Project Title	Campus	FY25 Estimate*	Project Type (CMR/SCMMR)	NIST Core Infrastructure	NIST Laboratory Programs
<b>NIST Coordinated Recovery Plan Projects FY23 - FY36**</b>					
Building 245 Modernization (Phase 2)	Gaithersburg	\$180 M	CMR		X
Building 3 Addition	Boulder	\$45 M	CMR		X
Research Building 1 (B228)	Gaithersburg	\$240 M	CMR		X
Building 101 Renovation & Addition	Gaithersburg	\$215 M	CMR	X	
Building 222 Renovation & Addition	Gaithersburg	\$335 M	CMR		X
Research Building "B"	Boulder	\$50 M	CMR		X
Research Building "A" & Parking Garage	Boulder	\$360 M	CMR		X
Building 221 Renovation & Addition	Gaithersburg	TBD	CMR		X
Building 220 Renovation	Gaithersburg	TBD	CMR		X
Building 223 Renovation	Gaithersburg	TBD	CMR		X
MR. Building, CCC & Upper Campus	Boulder	TBD	CMR	X	
Central Utility Plant Modernization & Expansion	Gaithersburg	TBD	CMR/SCMMR	X	
Underground Utilities Replacement	Gaithersburg	TBD	CMR/SCMMR	X	
Campus Entrance Gate A	Gaithersburg	\$16 M	SCMMR	X	
Campus Entrance Gate F	Gaithersburg	\$50 M	SCMMR	X	
<b>NIST Major Construction Projects in Support of Future Requirements</b>					
Parking Garage & Computing Center	Gaithersburg	\$130 M	CMR	X	
Research Buildings II, III & IV	Gaithersburg	\$440 M	CMR		X
Standard Reference Materials Building	Gaithersburg	\$160 M	CMR		X
Fire/Wind Tunnel Facility w/ Emissions Control	Gaithersburg	\$475 M	CMR		X
Building 245 E-Wing High Performance Computing Ctr.	Gaithersburg	\$35 M	CMR		X

\*Items with FY25 cost estimates are considered shovel ready, meaning they are ready for submission for procurement with an estimated PALT of ~2 years and an estimated completion date of ~5 years following appropriation

\*\*Construction priorities current as of FY24, but are subject to change based on emerging needs and funding availability



## Lab Condition & Mission Impact Analysis Survey

- 1.) Survey of all labs at NIST
- 2.) Review of research requirements vs actual conditions
- 3.) Labs identified by CET per FY24 White House listing
- 4.) ROM quantification of mission impacts due to facility conditions (Annual % range)

### **Benefits:**

- 1.) Quantify impacts by CET for targeted data capture of NIST comms/messaging/budget formulation
- 2.) ID worst labs for developing impact stories
- 3.) Identify SCMMR project priorities that may not otherwise have been ID'd

### **Notes:**

- 1.) Initial data call to be completed by the end of JUN 2024
- 2.) OSTP has already requested data once it is compiled



**Questions?**