Information Item:
Summer Intern Presentations

Jennifer Zuchowski, Manager, Workforce and Equity
Suidi Hashi, Associate Community Outreach Coordinator

Environment Committee: August 10, 2021

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Fort Snelling River Sample Point Study

Mehdi Harley, Water Quality Monitoring Intern

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Introduction

- Georgia Institute of Technology
- Incoming Senior
- Major: Environmental Engineering
- Minor: Sustainable Urban Planning
- Fort Snelling Sample Point Study

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Fort Snelling Sample Point Study

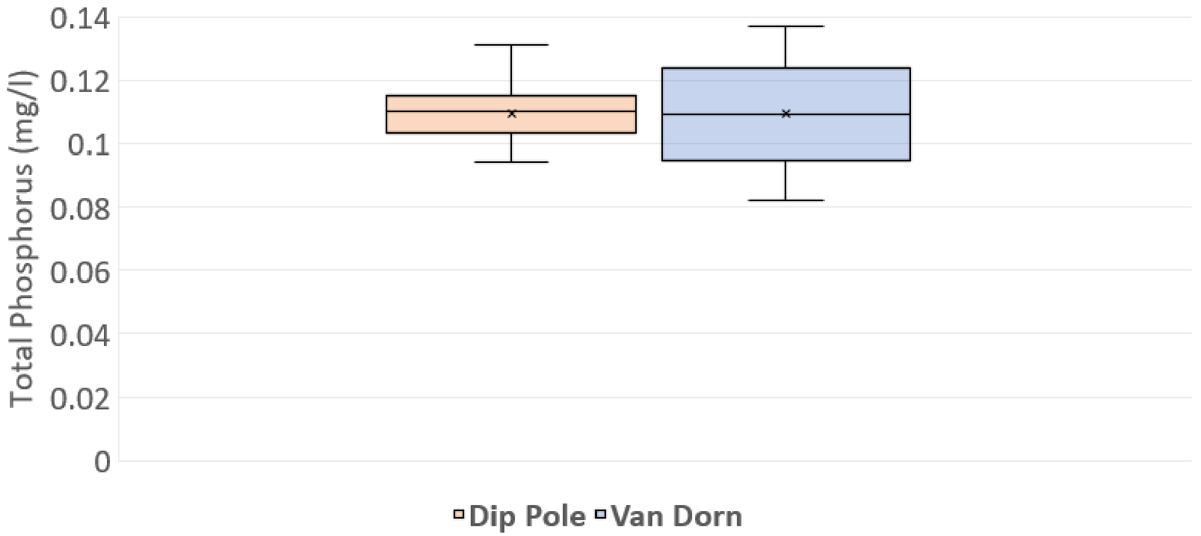
Background

- Monitoring of the Minnesota River at Fort Snelling
- Sampling methods
  - Van Dorn
  - Dip pole
- Testing important parameters

Fort Snelling Sample Point Study

Results So Far

Parameter	Pooled Average (mg/l)	% Difference	Actual Difference (mg/l)	Pooled StDev	Effect size (d)	P-value
TSS	46.56	0.72	0.33	5.66	0.06	0.864
Chloride	35.31	0.21	0.07	1.04	0.07	0.843
TP	0.11	0.06	0.00	0.01	0.00	0.990
TKN	1.24	1.11	0.01	0.07	0.19	0.602
NOx	3.04	1.44	0.04	0.05	0.87	0.012



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Questions

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Standardizing Emergency Action Plan (EAP)

Kiana Martinez, Environmental Health & Safety (EHS)

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Kiana Martinez

University Of Minnesota - Twin Cities

Graduated (May 2021!)

Environmental Science- Policy, Law, Society, & Planning

EAP (Emergency Action Plan)

What is the EAP ? Why is it important?

- 30-60 page documents describing protocol on how to handle different types of emergencies
- 14 plants involved in this project
  - All plants had different information- not consistent!
  - Standardizing a new EAP for all the plants to use

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Internship Lessons

- Compile large amounts of information
- Researching
- Critical thinking around the needs and realities of workers
  - Catering information to make sure that it's clear and concise

All important to creating a functioning work environment!

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Questions

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Underground Structure Data Creation

Jack Acomb, Environmental Services Geographic Information System (GIS)

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Introduction

- **School**: Macalester College
  - Incoming Senior
- **Majors**: Geography and Applied Mathematics/Statistics
  - Minor: Urban Studies
- Summer intern with the **ES Geographic Information Systems (GIS)** team
- **Project: Mapping Underground Structures**

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Mapping Underground Structures: What and Why?

Goal: Establish *size* and *profile* of underground structures in the wastewater network within GIS

- **Why?:**
  - Visualize the extent of structures
  - Gopher State One Call (“Call before you dig”)
  - Expand the capabilities of MCES’ GIS system

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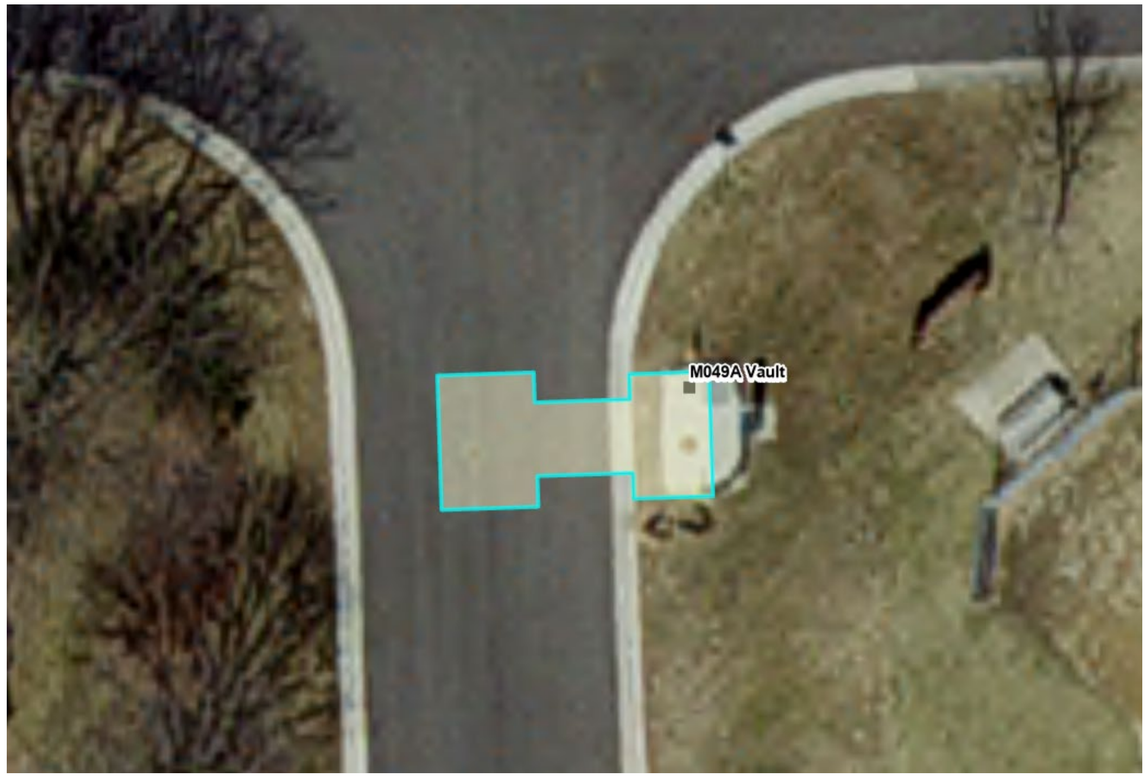
Holistic Approach to Data Design

Involved with this project from beginning to end

- **Designed** the database from scratch
- **Generated and mapped data**
- **Creating** metadata
- **Publishing** for Council-wide use



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Questions

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ES Racial Equity Initiative

Donovan Taylor, ES Urban Scholar, Workforce & Equity

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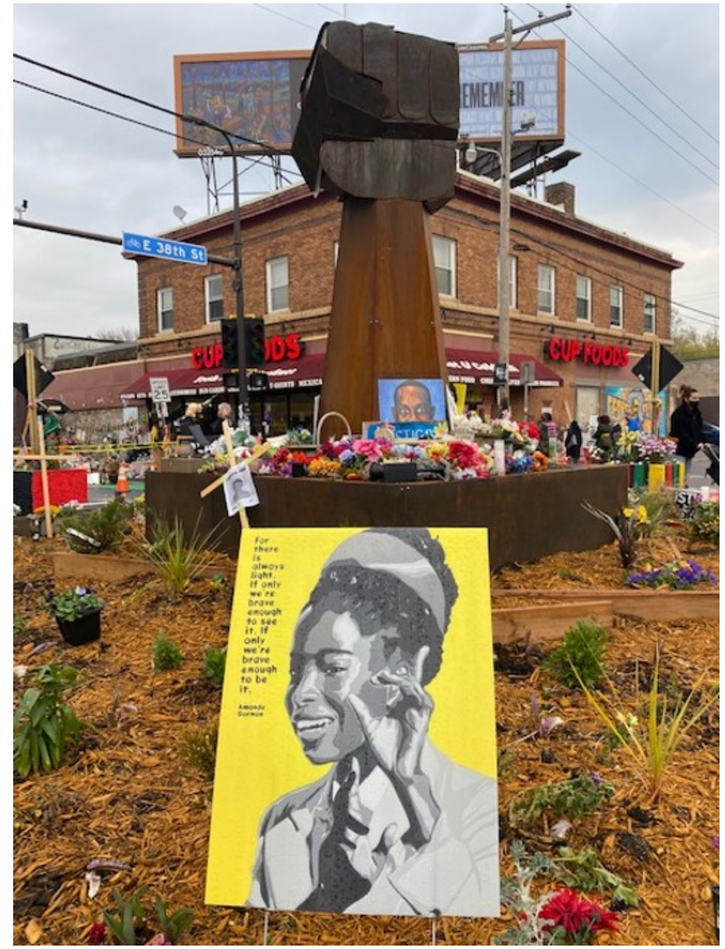
Introduction

- Urban Scholar Intern, ES Workforce and Equity
- Senior: Fall 2021, Graduation: May 2022
- Northland College, Ashland, WI
- Major: Business Management, Minor: Psychology



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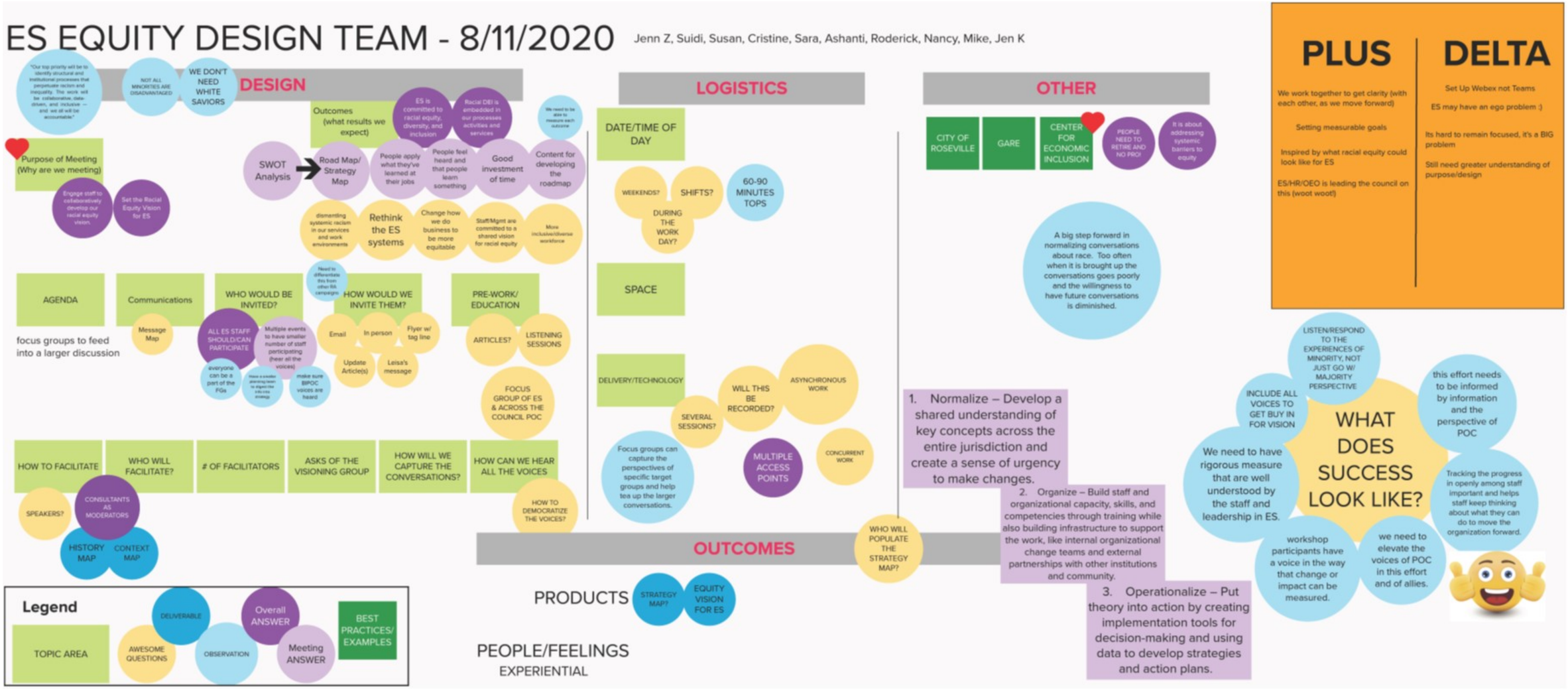
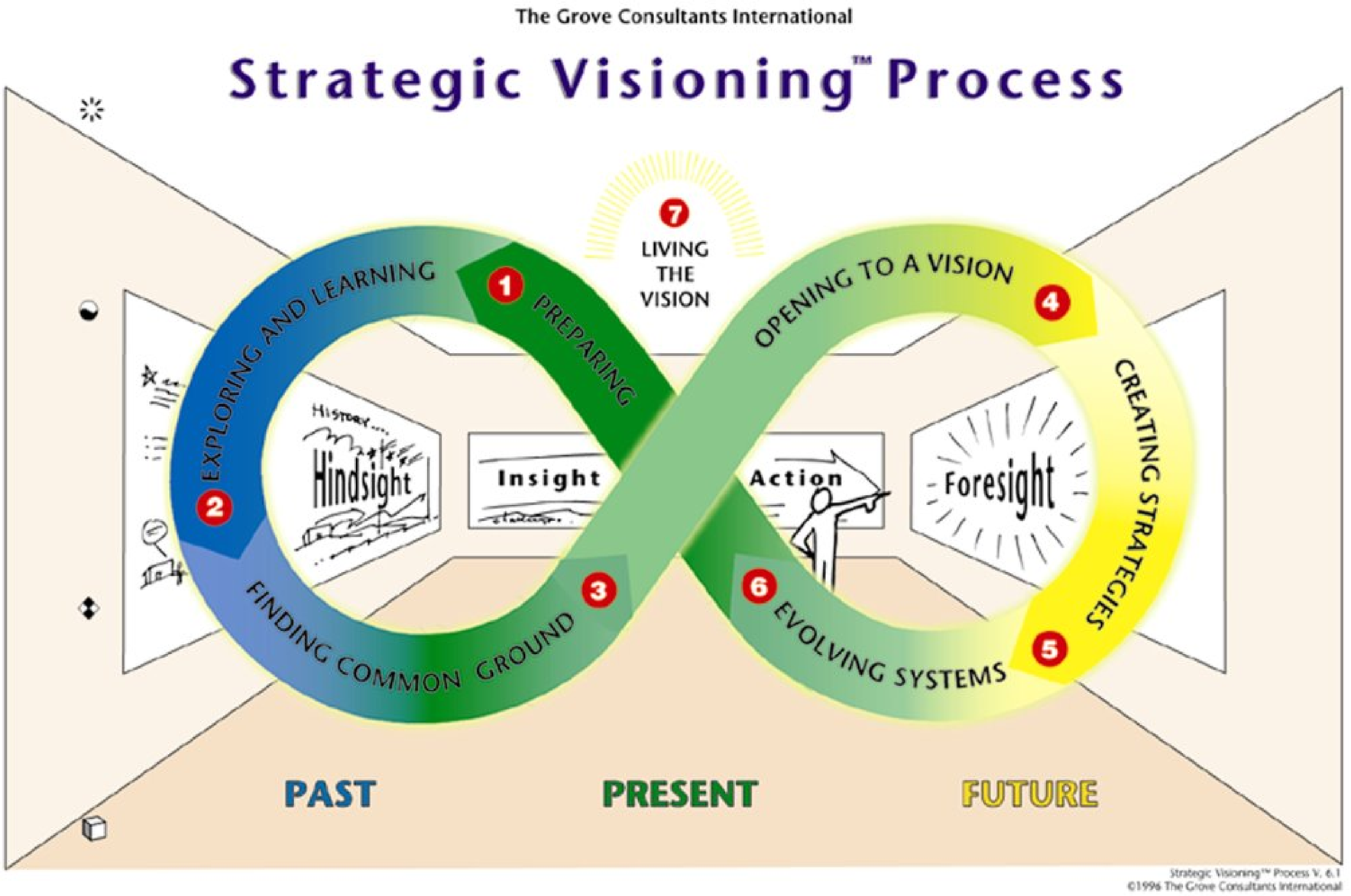
ES Racial Equity Initiative



Strategic Visioning Process



Advancing Diversity, Equity & Inclusion

What does it mean?

- Reducing barriers to opportunity
- Dismantling institutional and systemic racism and bias
- Including multiple perspectives and diverse experiences, education, skill sets, beliefs, and personalities
- All employees feel welcome and valued

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Advancing Diversity Equity & Inclusion

Why make the commitment and investment?

- Organizational culture
- Recruitment and retention
- Innovation and growth
- Community engagement
- Economic vitality

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Questions

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3-D Analysis and Augmented Reality Training

Maxwell Savage, Performance Excellence and Analytics (PXA)

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Introduction

- Hubert H. Humphrey School of Public Affairs (UofMN Twin Cities)
- Incoming Second Year
- Master of Urban and Regional Planning
- Creation of Virtual Twins

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Work for the Council

- Research on a potential Drone Program
- HoloLens experience and training pilots
  - Including analysis of Vuforia vs. Microsoft Guides
- Digital twins of several MetCouncil facilities including
  - Empire Plant Digester #1
    - Metroplant: Compressor Building, Sludge Thermal Conditioning (STC), Solid Sludge Transfer (SST), Administration, Maintenance and Warehouse (MWH), etc.
  - Additional potential applications beyond ES (Transit Stops)
- Standardized format for EAPs across plants

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Personal Advancement

- A working understanding of MetCouncil as a regional governing body
- Proficiency with Holographic AR training tools
- Experience with 3D scanning cameras and the creation of virtual environments
- Facility with XML and authorship of structured documents

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Questions

Maxwell Savage
Business Systems Analyst Intern
Performance Excellence and Analytics
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Process Computer Group Firewall Upgrade

Laeticia Malungu, Wastewater Treatment Plant

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Introduction

College & University

- Minneapolis Community & Technical College: May 2017
- Metropolitan State University : August 2020

Majors

- Computer Support & Network Administration (AAS)
- Information Assurance (BAS)

Summer Project

- Process Computer Group (PCG) Firewall Upgrade
  - Manage SCADA Network (Industrial Control Network) for 9 wastewater treatment plants
  - The result of approved Business Item 2020-271 (October 13, 2020)

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Network Firewall Upgrade

Firewall

- To maintain the security of a private network
- Block Unauthorized access to and from a private network

Upgrading Reasons

- Devices' end of life (can present a security issue to the network)
- Newest Technology: Implementing advanced security features

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Network Firewall Upgrade (continued)

Goals

- Upgrade without interruption and downtime to the production control system
- 9 Wastewater treatment plants and 18 appliances (2 per plant)

Participation and Experiences

- Trained and performed the Cutover (from the old devices to the new devices)
- Hands on and Real World Work Experience

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Questions

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Technical Writing Intern Presentation

Madison Bowes, Operations Support Services

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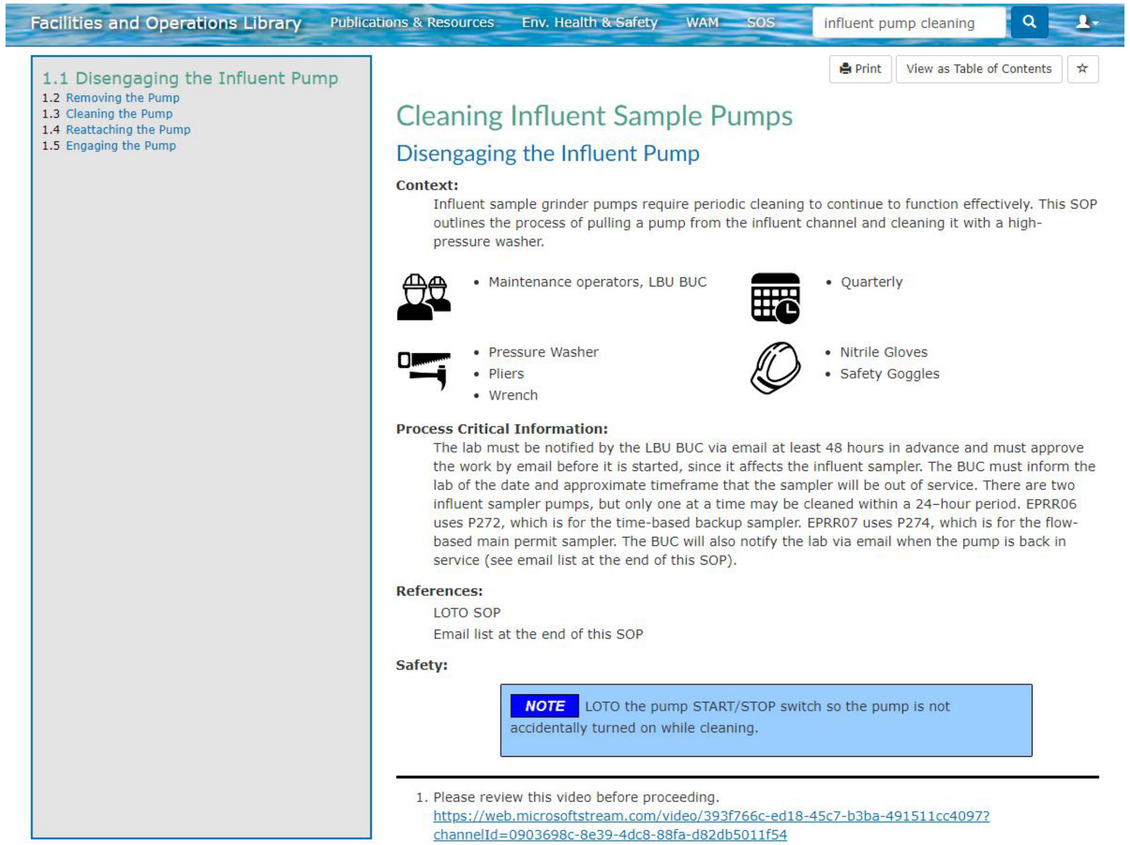
Introduction

- University of Minnesota – Twin Cities
- Graduated May 2021
- Major: Bachelor of Science, Technical Writing and Communication
- Minor: Public Health

Writing SOPs

- **Standard Operating Procedure (SOP)**
- Field work with Subject Matter Experts
  - Plant Operators
  - Maintenance Operators
- 3 Step Process:
  1. Gathering Information
  2. Authoring
  3. Publishing
- Video Projects



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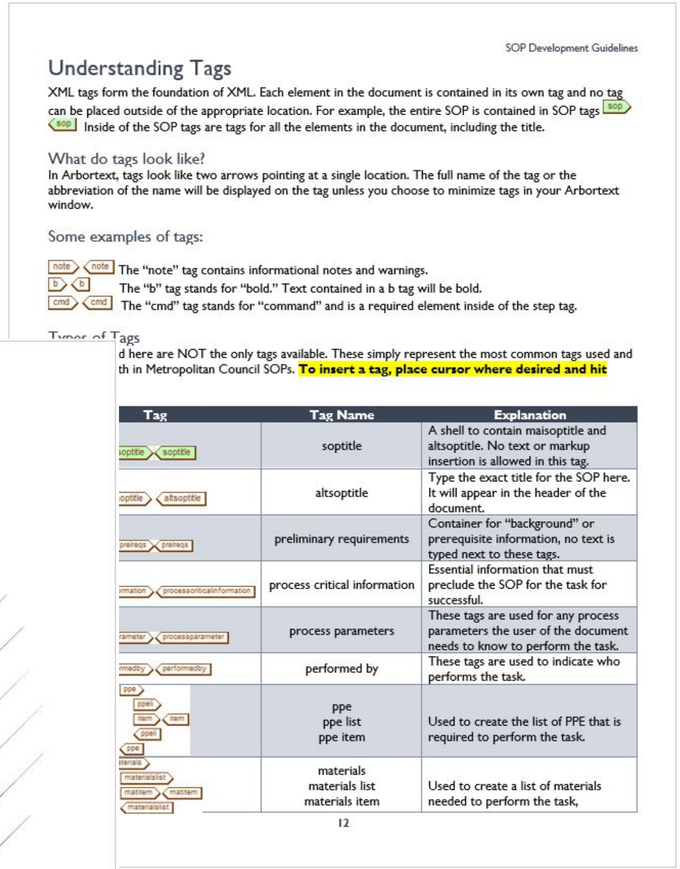
SOP Development Guidelines

- Currently Updating
- Authoring Tool = Arbortext
- Other Tools
  - Reviewing & Publishing
- To be used by…



SOP Development Guidelines

Understanding Tags

XML tags form the foundation of XML. Each element in the document is contained in its own tag and no tag can be placed outside of the appropriate location. For example, the entire SOP is contained in SOP tags <sop> </sop> Inside of the SOP tags are tags for all the elements in the document, including the title.

What do tags look like?

In Arbortext, tags look like two arrows pointing at a single location. The full name of the tag or the abbreviation of the name will be displayed on the tag unless you choose to minimize tags in your Arbortext window.

Some examples of tags:

<note> The "note" tag contains informational notes and warnings.
<b> The "b" tag stands for "bold." Text contained in a b tag will be bold.
<cmd> The "cmd" tag stands for "command" and is a required element inside of the step tag.

Types of Tags

d here are NOT the only tags available. These simply represent the most common tags used and th in Metropolitan Council SOPs. **To insert a tag, place cursor where desired and hit**

Tag	Tag Name	Explanation
<soptitle>	soptitle	A shell to contain maisoptitle and altsoptitle. No text or markup insertion is allowed in this tag.
<altsoptitle>	altsoptitle	Type the exact title for the SOP here. It will appear in the header of the document.
<prereqs>	preliminary requirements	Container for "background" or prerequisite information, no text is typed next to these tags.
<processcriticalinformation>	process critical information	Essential information that must preclude the SOP for the task for successful.
<processparameter>	process parameters	These tags are used for any process parameters the user of the document needs to know to perform the task.
<performedby>	performed by	These tags are used to indicate who performs the task.
<ppe> <ppeli> <item> <item> <ppeli> <ppe>	ppe ppe list ppe item	Used to create the list of PPE that is required to perform the task.
<materialslist> <matitem> <matitem> <materialslist>	materials materials list materials item	Used to create a list of materials needed to perform the task,

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Questions

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Augmented Reality (AR), Virtual Reality, (VR) and Three Dimensional (3D)

Hayley Ringhand, Performance Excellence & Analytics (PXA)

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Introduction

- University of Minnesota-Duluth
- Sophomore
- Chemical Engineering
- 3D Scanning & Augmented Reality (AR), Virtual Reality (VR)

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3D Scanning & AR/VR

- 3D Scanning Explanation
- HoloLens Description
- Uses for Training
- Future Implications

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Value of Internship

- Workplace Experience
- Project Management
- Educational Opportunities
- Working with many emerging technologies

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Questions

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Microbrewery Self-Reporting Guidance

Amber Orr, Industrial Waste and Pollution Prevention (IWPP)

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Introduction

- Nova Southeastern University (Ft. Lauderdale, FL)
- Senior
- Environmental Science/ Marine Biology Major
  - Post Baccalaureate Certificate in Paralegal Studies
- Industrial Wastewater Self-Reporting for Microbreweries

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Industry Standards Research

- High industrial wastewater discharge
- Wastewater deduction inconsistencies
  - Evaporation
  - Spent grain

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Permittee Self-Reporting Information

How the findings were applied:

- Facility tracking document
- Help video
- Letter to permittees
- Instruction sheets

Questions

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Rogers Solids Optimization

Will Scofield, Process Engineering

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Introduction

College: University of Manitoba (Winnipeg, MB, Canada)

- Entering final year of studies in 5-year Biosystems Engineering program

Rogers Solids Optimization

- 2030 site decommissioning, regional service transferred to new plant
- On-site sludge storage pond consistently being overloaded
  - Eliminate at the source by optimizing plant processes
  - Secondary elimination
- Understand mass transfers, understand generation, reduce

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Modeling

BioWin Model Wastewater Treatment

- Construct site model using knowledge of layout, flows, process metrics
  - Calibrate influent (in-flow) metrics to observed effluent (out-flow) and mid-process data
- Identify parameters that can be changed
  - Chemical input, dissolved oxygen, flow split(s)
- Adjust parameters in concert and isolation
  - Relationships? Are they (in)dependent?
  - Perform regression on datasets
- Optimize for solids reduction
  - Boundary conditions: what are operators/managers comfortable with? Permit limits?
  - Use relationships from model to predict optimal values
- Experiment

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Experiments

Optimization Experiments

- Exp.1: Chemical input only
  - Used to remove phosphorus – more chemical, more sludge production
  - July 12th – July 30th → Data collection **ongoing**
- Exp.2: Chemical input, RAS/WAS flow split, dissolved oxygen
  - Estimated reduction in sludge prod. up to 5%, effluent nitrogen reduction up to 80%
  - August 2nd – Present → Data collection **pending**
- Bioaugmentation

Clarifier Flow Experiment

- Flow split from components unknown, performed experiment
  - Flow tool fitting curve to data, combine w/theoretical fluid mechanics

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Questions

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