Location Intelligence

October 2022

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What is GIS?

- GIS – Geographic Information System
- A system of HW & SW that supports:
  - Capture
  - Management
  - Manipulation
  - Analysis and
  - Display of *“Geographic Information”*
- Location Intelligence extends the realm of above technology to geography and business.
- Released in 1990 by ESRI, ArcGIS has become the most popular GIS software in the world.

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Benefits of GIS

- Linking Location and Descriptive Attributes
- Providing a *Unified and Centralized Database*
- Manipulating & Analyzing *Geographic Information* in new ways
- Automating *Map Making and Updating*
- Better *Information Management*
- Higher quality analysis
- Ability to carry out *“What If?”* scenarios

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ArcGIS

Environmental Systems Research Institute (ESRI)

- ArcGIS is systemic software developed by ESRI. It is organized into many different applications and versions which can be utilized according to needs.
- Cloud Structure/AGOL
  - Organization
  - Groups
  - Members
- License Tiers
  - Viewer (online)
  - Field (online)
  - Professional (desktop)
- Enterprise/Portal
  - Datastore & Database
  - Servers
  - Organization/Portal
  - Groups
  - Members

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Let's Redefine Possible

VDC & Technology Timeline

1995: Center for Construction Innovation

1995: Disney Concert Hall, first 4D simulation

2001: Clash Detection introduced

2003: IDAT formed

2005: The Last 100ft®

2009: Enclosure Systems, first Virtual Mockup

2010: "40 to 400"

2011: Laser Scanning process defined

2012: CAVE Immersive Environment, first VR experience

2012: Expand VDC to E&I, applications for Wind Energy

2014: Published 'VDC-Driven Outcomes' Report

2015: Established enterprise partnership with Procore

2017: Launched Virtual Insights, advanced visualizations

2018: "Moving to the Left"

2018: Established enterprise agreement with Autodesk

2019: Developed first project with GIS data

2020: Expanded DfMA with model-based manufacturing

2022: "Integrated Digital Thread"

2022: Established Advantage Program with Esri

Transformational Innovation | Exceptional Teams

FOCUS ON FLAWLESS PROJECT DELIVERY THROUGH AN **INTEGRATED DIGITAL THREAD**

Diversified Markets | Transformational Innovation

TRAILBLAZE INDUSTRALIZATION AND DESIGN FOR MANUFACTURE & ASSEMBLY DIGITALIZATION

Exceptional Teams

BUILD TALENT AS **INDUSTRY VDC LEADERS** AND BE INDISPENSABLE TO OUR CUSTOMERS

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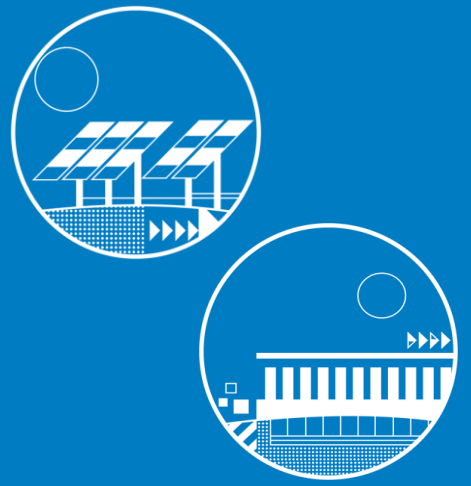
History of ArcGIS in Mortenson

2019
WIND BREAKS GROUND

2020
CIVIL DIGS DEEPER

2021
SOLAR & DATA JOIN THE MOVEMENT



2022+
COMPANY WIDE STANDARDIZATION

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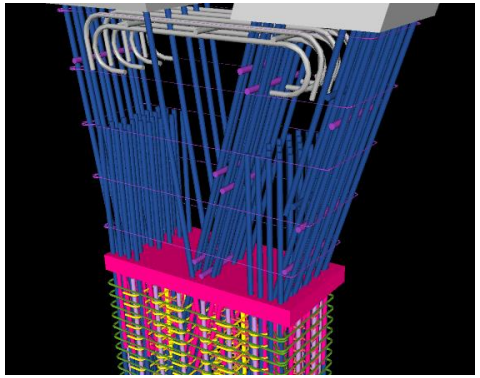
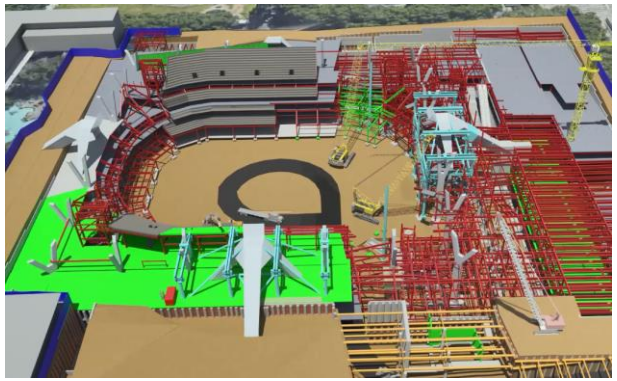
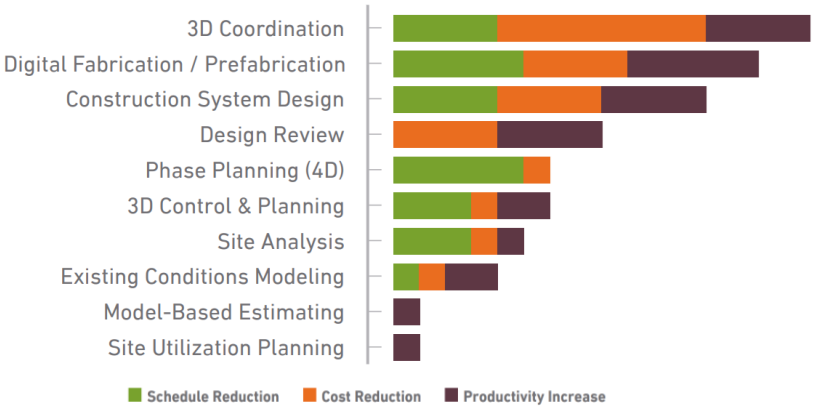
BIM Uses

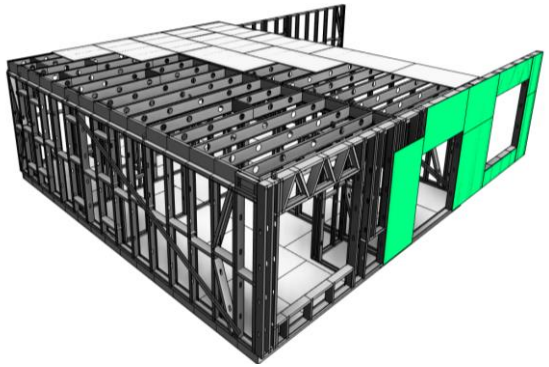


Construction System Design



Phase Planning (4D)



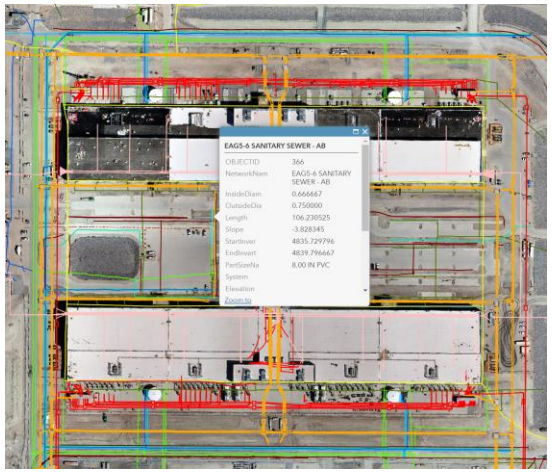


Digital Fabrication

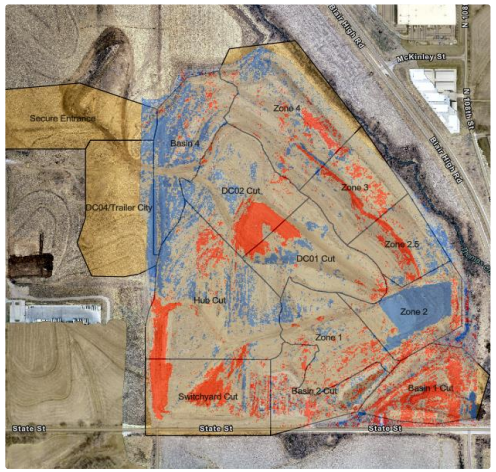
Design Review

+10 ACTIVE BIM USES

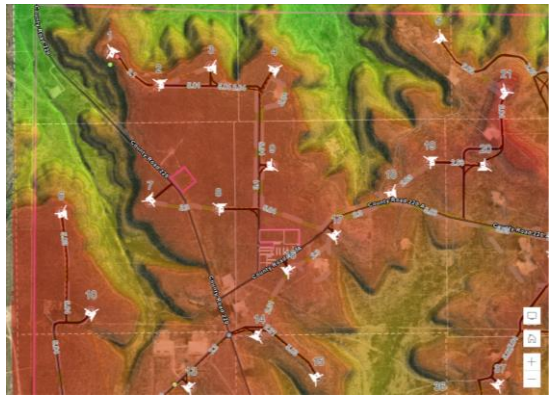
GIS Uses



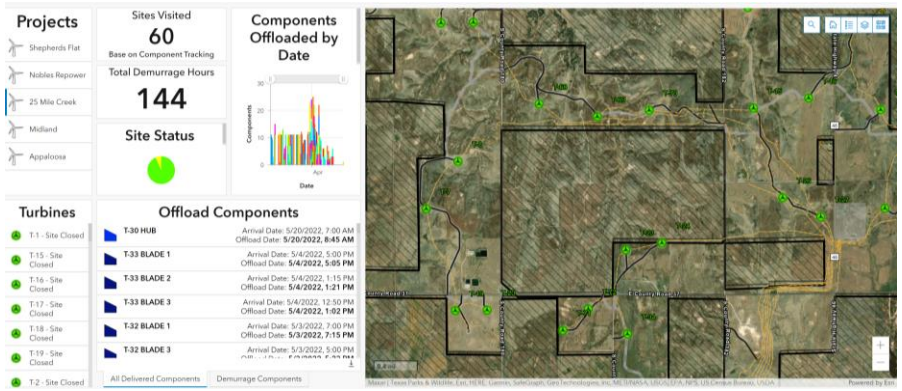
Live Utility Awareness Maps



Earthwork Production Tracking



Site Layout & Design Optimization



Component & Material Tracking

+13 ACTIVE GIS USES

FLAWLESS PROJECT DELIVERY

REINFORCING OUR TOP 10

ARCGIS PLATFORM

VISION: Standardize the use of ESRI's ArcGIS across our E&I businesses and establish a platform for consistent and organized data management.
This relies on clarity in our current state, establishment of an ArcGIS strategy and engagement with group champions to scale and accelerate adoption.

BRIAN NAHAS
Director of VDC

ALISON HART
Manager of Project Solutions

HANS MILLER
ITS Manager

Led by:
VDC, PS & ITS

Coordinating With:
DP, P&S

OG Impact:
E&I, Data Centers

2021 CURRENT STATE

ArcGIS is a software platform which allows users to create, edit, analyze and view geo-referenced data sets. Through contextual tools to visualize and analyze project information, teams collaborate, share, and develop maps, reports, or dashboards from location intelligence to transform the way we plan, design, build and operate our projects.

Momentum has grown within our Civil and Wind groups within the past year, and ArcGIS is proving to be a key **operational component**, changing our site analysis, engaging our field team members on data collection, and driving transparency across sprawling projects. Mortenson now has over 605 named ArcGIS users, and we are positioned to establish an enterprise strategy.

< CLICK TO LEARN MORE ABOUT ESRI's ArcGIS >

2022 INITIATIVE

DEFINE GIS CAPABILITIES

Goal: Discover, share, and assess active use cases and potential within 6 Operating Groups (Civil, Wind, Solar, Power, Engineering Services, and Data Center). *Engage 3rd Party GIS expert on analysis and recommendations on enterprise implementation.*

2022 Activities:
- ❑ Define Group objectives & aspirations
- ❑ Conduct OG-based user interviews
- ❑ Conduct (2) project cross-functional interviews
- ❑ Review multi-division needs assessment

Targeted Outcomes:
- ❑ Define the SME network
- ❑ Document current state practices
- ❑ Draft Implementation Plan (Pro-West)

VISION & STRATEGY

Goal: Clarify the outcomes of the assessment process, aligning OG leaders and GIS Champions on roadmap to implemented recommendations. *Expand and operationalize GIS best-practices across all E&I groups.*

2022 Activities:
- ❑ Align OG's on unified, and individual GIS implementation plans
- ❑ Establish ITS infrastructure needs
- ❑ Define cross-platform integration (Procore, Autodesk)
- ❑ Identify project for pilot for 'quick wins'

Targeted Outcomes:
- ❑ Communicate 5 Year GIS Vision
- ❑ ITS support & infrastructure investment
- ❑ Organize and identify GIS 'skills' req'd

IMPLEMENTATION

Goal: Communicate ArcGIS strategy and align to active projects to implement core practices, and onboard additional team member positions. *Deliver consistent baseline GIS workflows with new features incorporated into identified pilot projects.*

2022 Activities:
- ❑ Establish core VDC workflows with ArcGIS Champion to coach other SMEs
- ❑ Develop Learning Paths based on position-type to onboard to ArcGIS platform
- ❑ Evaluate opportunity to utilize on Data Center, or Commercial project type

Targeted Outcomes:
- ❑ Increase user group from 605 to 900
- ❑ 100% projects in Civil and Wind
- ❑ 65% projects in Solar
- ❑ 1 project in Data Center

EXAMPLES OF CURRENT GIS USE CASES

13	DEVELOPED
8	TESTING
5	EVALUATING
9	SCOPING

- ✓ **Dig Permits**: Submitting and Tracking within Survey123 and ArcGIS Pro
- ✓ **ArcGIS Hub for Civil Projects:** Centralized project data across the country
- ✓ **Crane Path Routing**: Optimized design of earthwork on Wind jobs in ArcGIS Pro
- ✓ **Plan of the Day (POD) Dashboard**: Daily input and update for Engineers. Promotes Collaboration
- ✓ **Tracking Exclusion Zones**: Protected Habitat, Wetlands, Historical & Cultural Artifacts…
- ✓ **Demographic Analysis**: ArcGIS Business Analyst improves insights into optimal location of healthcare facilities

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MORTENSON GIS STATISTICS

645+

GIS Users

60+ Author/Editors

35+

Use Cases

Mostly Wind/Solar

6

External Pros

App Development

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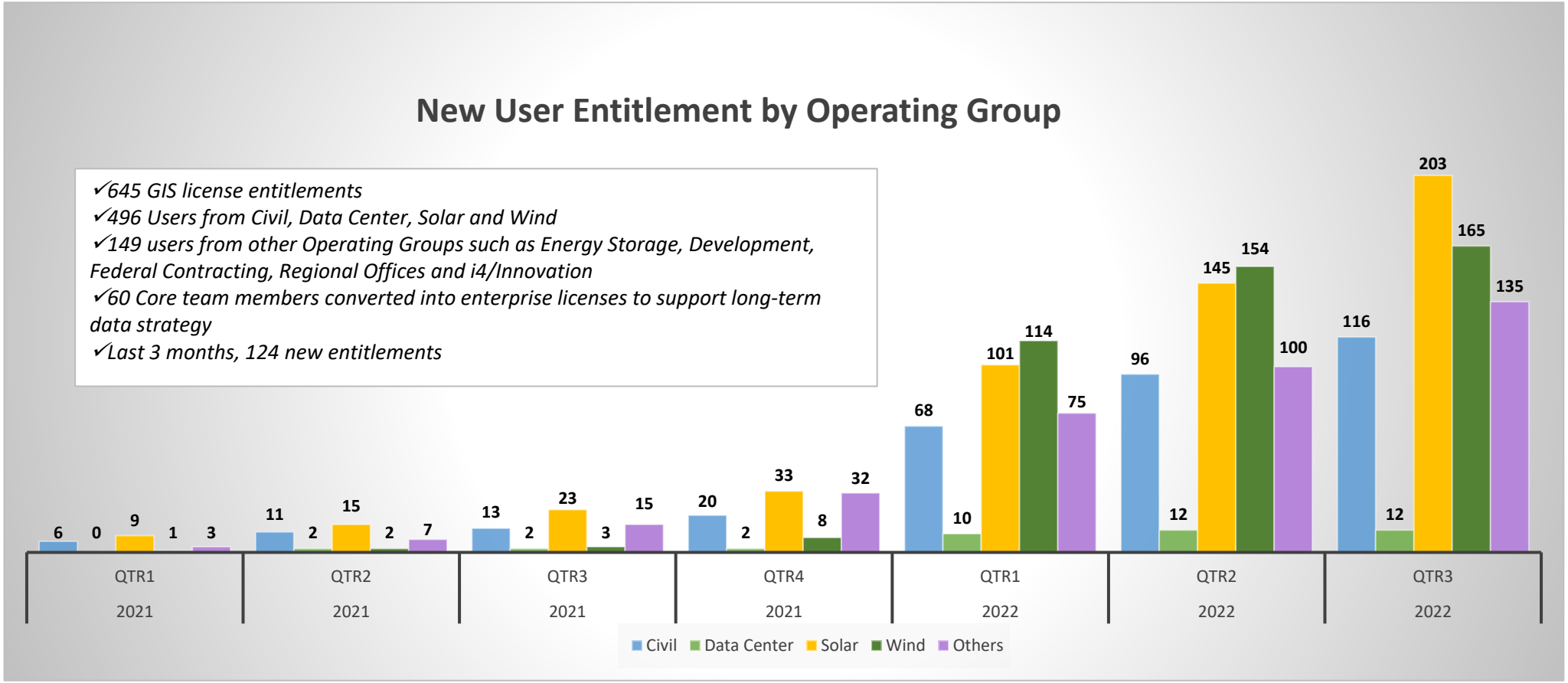
MORTENSON GIS STATISTICS



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LOCATION INTELLIGENCE

Esri ArcGIS

The key vision and strategy for 2023 is to standardize the use of ESRI's ArcGIS across our E&I businesses and establish a platform for consistent and organized data management. Expand our relationship with ESRI and enhance team member development in GIS application by building on momentum from 2022, increasing organizational focus on Location Intelligence.

OUR Goals:

- Create a stable & scalable enterprise GIS system
- Increase sharing and collaboration with operating groups and business partners
- Provide a centralized database and National Dataset as source of truth for all projects
- Improve & expand GIS skills through role-based training initiatives and project-based trainings
- Standardization across projects
- Documentation of workflows
- Demonstrate the value of GIS, share success stories and cultivate the culture of spatial thinking
- Provide a balance between ArcGIS Online & Enterprise.

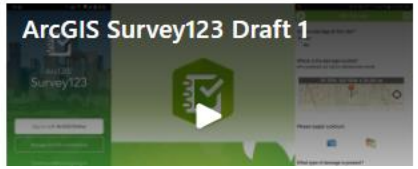
esri
THE SCIENCE OF WHERE™

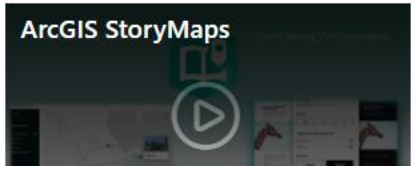
Access to ArcGIS via your web browser: **HERE**

For mobile access, download the **Field Maps** app through your app store on your mobile device or through the Mortenson App Store on your Mortenson issued iPad.

A geographic information system (GIS) is a system that creates, manages, analyzes, and maps all types of data. GIS connects data to a map, integrating location data (where things are) with all types of descriptive information (what things are like there). This provides a foundation for mapping and analysis that is used in science and almost every industry. GIS helps users understand patterns, relationships, and geographic context. The benefits include improved communication and efficiency as well as better management and decision making.

Mortenson's GIS Journey | Mortenson's GIS Use Cases | Esri Partner Network





https://mortenson.sharepoint.com/sites/ProjectSolutionsManual/SitePages/Esri.aspx

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EXPLORE, PILOT & SCALE

2023 LOCATION INTELLIGENCE VISION

VISION: Standardize the use of ESRI's ArcGIS across our E&I businesses and establish a platform for consistent and organized data management.

Expand our relationship with ESRI and enhance team member development in GIS application by building on momentum from 2022, increasing organizational focus on Location Intelligence.

esri Partner Network Bronze

Led by:
Sanhita Chatterjee

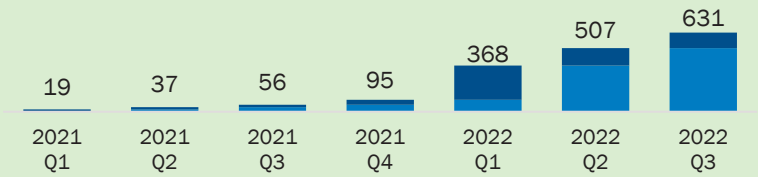
Coordinating With:
GIS SME's,
Group IC Leads,
Project Solutions,
Esri (vendor)

2022 MOMENTUM

Aligning on a common foundation supporting sustained growth & adoption based on the 2022 GIS Strategic Plan, the GIS core team with 15 subject matter experts (SME) will continue to establish standardized and centralized Location Intelligence (LI) policies, licensing, procedures, and trainings across the organization by:

1) Creating and supporting a stable & scalable enterprise LI system,
2) Improving standardization across projects,
3) Continue the documentation of workflows,
4) Establishing and maintain a centralized database,
5) Establish a National Dataset as source for all projects,
6) Improving & expanding LI skills through role-based trainings
7) an enterprise license agreement and partnership with ESRI

The GIS core team has successfully shared and collaborated across groups to support substantial user growth from 2021.



2023 PLAN

INTERNAL ADVANCEMENTS

Deliver consistent baseline GIS workflows for project teams, while onboarding new positions and roles to GIS utilization. Support standardization and scaling of Location Intelligence data architecture for National Datasets.

- Support implementation for Power, Storage, and Federal Operating Groups.
- Use Cases & Workflow 'How-To' Videos
- Expanded communication around role-based Esri Training & Learning Paths
- Monitor and advise on platform integrations (Procore, Autodesk, etc.)
- Enhance and maintain Project Solutions 'Esri' Page

EXTERNAL ENGAGEMENTS

Increase presence and impact of GIS within the AEC community. Establish relationships with Esri market leaders and peer organization to define GIS practices within the construction space and AEC industry. Communicate and share outcomes of initial GIS journey at Mortenson.

- Engage in Esri conferences and other AEC events
- Present and share outcomes with industry Peers
- Support GIS Day and other recognitions
- Partner with Universities for future GIS talent

Click to view the 2022 GIS Strategic Plan.
Developed with Pro-West.

GIS Use Cases (LINK)

35 IDENTIFIED GIS USE CASES IN 2022

- **13** DEVELOPED
- **8** TESTING
- **5** EVALUATING
- **9** SCOPING

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