Bioretention Facilities:
Lost in Translation at the Construction/Installation Level

An Inspector's-Eye View of Bios Gone Awry

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Darlene Robbins, Senior Inspector
Stormwater Maintenance, LLC

Overview

I. **A View from the Field; Bios Gone Awry**
   Bioretention Basics
   What is happening on the ground
   Aspiration vs. Reality

II. **Lost in Translation**
   When and where is this happening and why
   Construction/Installation Phase

Overview

III. Getting to Gestalt

How we can do better

Models for success?

IV. Wrap up

Shared tips and success stories

I. A View from the Field

Bioretention Basics

Bios are an important, versatile BMP

One of the most commonly used BMPs in the landscape, in all its forms

Small-scale, residential

Large, parkland settings

Highly urban

Highly effective—infiltrating water, catching sediment and removing pollutants

Living components: provide ecological benefits




Can be a beautiful feature in the landscape

The reality: a whole host of challenges

- We ask a lot from bioretention
- Have to interact with the environment in often hostile conditions
- Too often these facilities are set up to fail or underperform from the get-go

Bios Gone Awry

What is happening?

Plant issues: too many of the bad kind

Foxtail Grass

Thistle

Phragmites

Too few of the good kind

Specific site conditions not well evaluated

Presence of deer = damage

Reliance on too few species

Not accounting for microclimates

Lazy planting “design”

Bad outcomes from seed mixes

Oversimplistic and uninspired

Impacts by surrounding uses not considered

Dog waste repository

Bio within school playground

Harsh conditions

Not designed with maintenance in mind

Physical constraints

Scale

Poor maintenance practices or outright neglect

Assault by vehicle

Human intervention

II. Lost in Translation

Between aspiration and reality

In terms of intent and function

Construction/Installation Phase

When and where is this happening, and why?

- Controllable part of the process
- Disconnect between design and installation
- Notable as part of new construction
- Bios are an afterthought
- Can be set up for failure from the get-go

When and Where:
Transition Zones

Concentrating large water volumes off impervious surfaces

Steep slopes

Erosion around structures

When and Where:
Unstable Slopes

Leaving steep slopes unstabilized

When and Where:
Surrounding Construction

Not protecting facilities from ongoing construction activities

When and Where:
Planting Deficiencies

OR

=

Why:

Some Thoughts

- Shear number of facilities being built + rapid pace = overwhelmed system, less QC
- Evolving practice
- Disjunction between design/engineering and construction/installation
- Different contractors; piecemeal approach
- Siloing within departments/disciplines; reluctance to collaborate
- Lack of feedback loops
- Lack of understanding of these facilities on part of on-site contractors and installation crews; leads to poor practices

Key Areas to Address:

More Specific/Practical

- Elevate importance of facilities within construction environment
- Better education of field crews—incentivize?
- Better sequencing of facility within construction process
- Better oversight during construction
- Post-construction monitoring and evaluation

Key Areas to Address:

Overall

- More collaboration across disciplines and departments
- Shared responsibility for success
- More feedback loops throughout process
- Monitor, evaluate, adjust
- More wholistic approach

III. Getting to Gestalt

Gestalt: (from psychology) the whole is perceived as greater than than the sum of its parts

Holism: (a philosophy) the idea that natural systems and their properties should be viewed as wholes, not as collections of parts

Wholistic approach

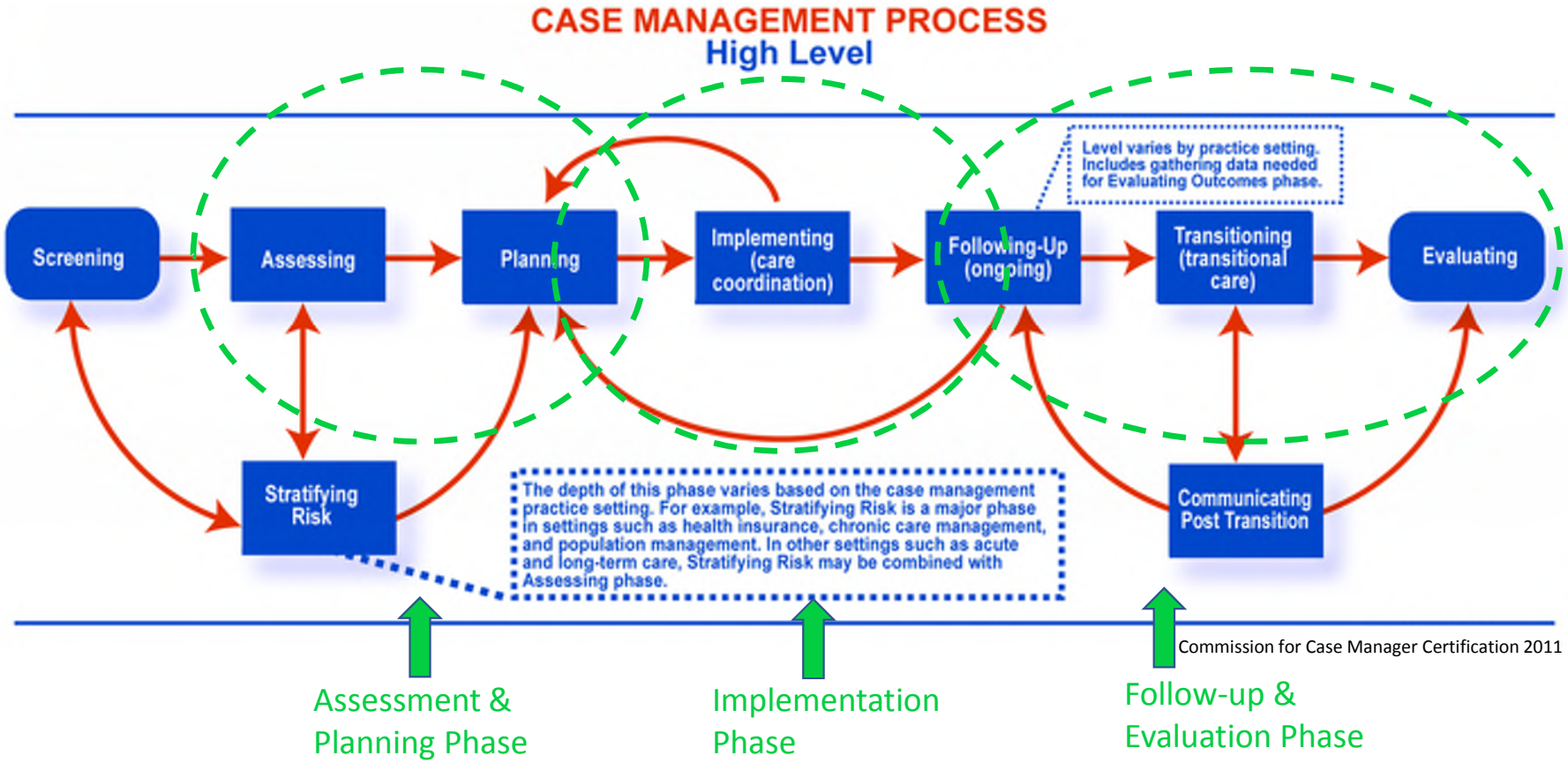
Strategy 1: Case Management

Health Care and Social Services Fields

What it offers:

- **Holistic** in its approach; relies on a **comprehensive plan**.
- **Collaborative** and cooperative.
- Draws on professionals from **within or across organizations and settings work together.**
- **Iterative and cyclical**, its phases being revisited as necessary to achieve desired outcome.
- Case manager with **broad knowledge base**.

What it looks like:



Assessment & Planning Phase

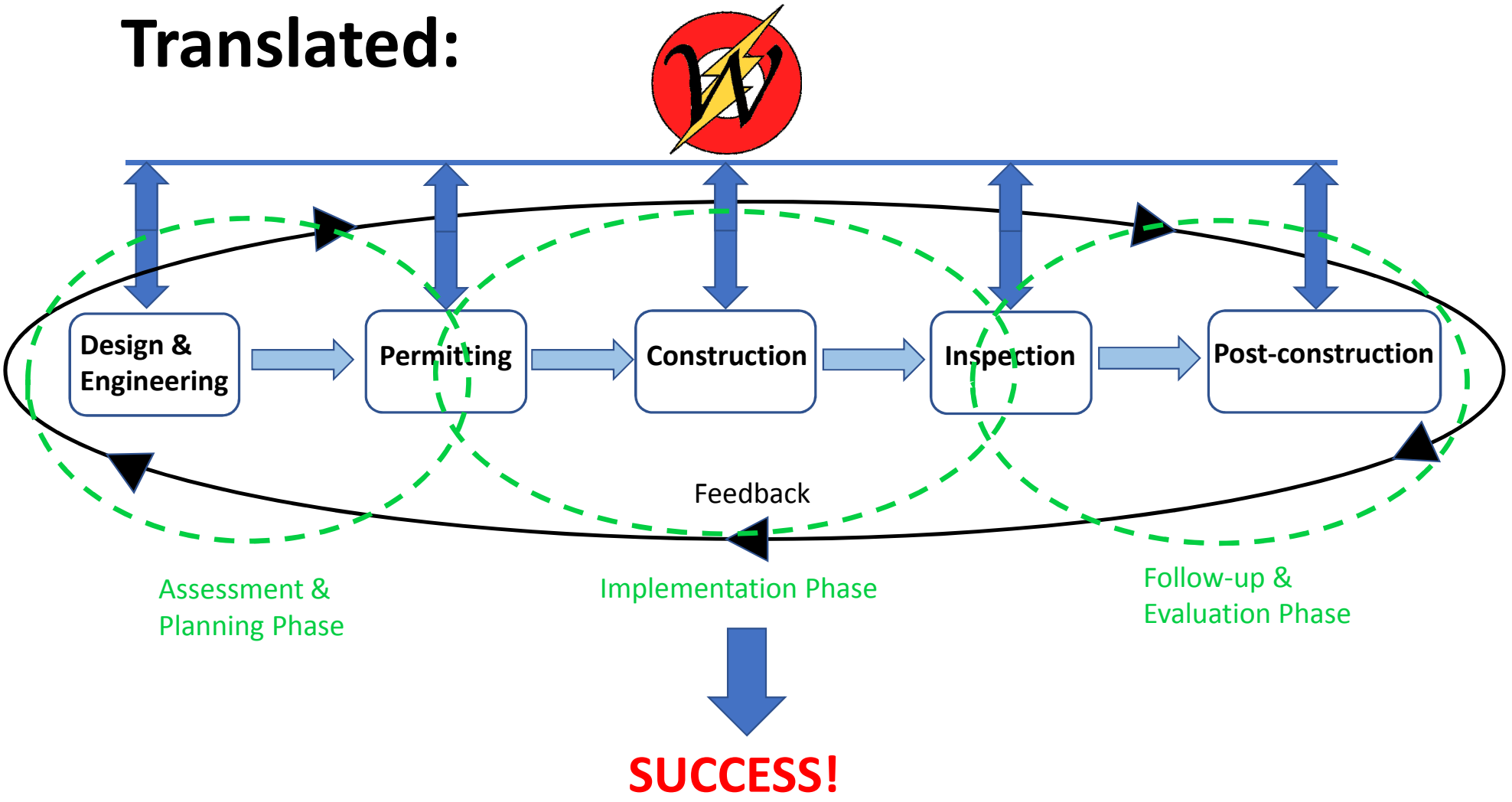
Implementation Phase

Follow-up & Evaluation Phase

Strategy 1: Appoint a “Captain Wholistic”

- Works within existing framework
- Transcends departments and disciplines; works collaboratively with all
- Works with internal staff and external contractors
- Broad knowledge base
- Follows project from inception through design, to post-completion

Translated:


Design & Engineering
Permitting
Construction
Inspection
Post-construction
Feedback
Assessment & Planning Phase
Implementation Phase
Follow-up & Evaluation Phase
SUCCESS!

Outcomes:

- Cooperation and collaboration
- More efficient use of resources
- Improved advocacy and communication
- Promotes quality and cost-effectiveness
- Better decision making through evaluation

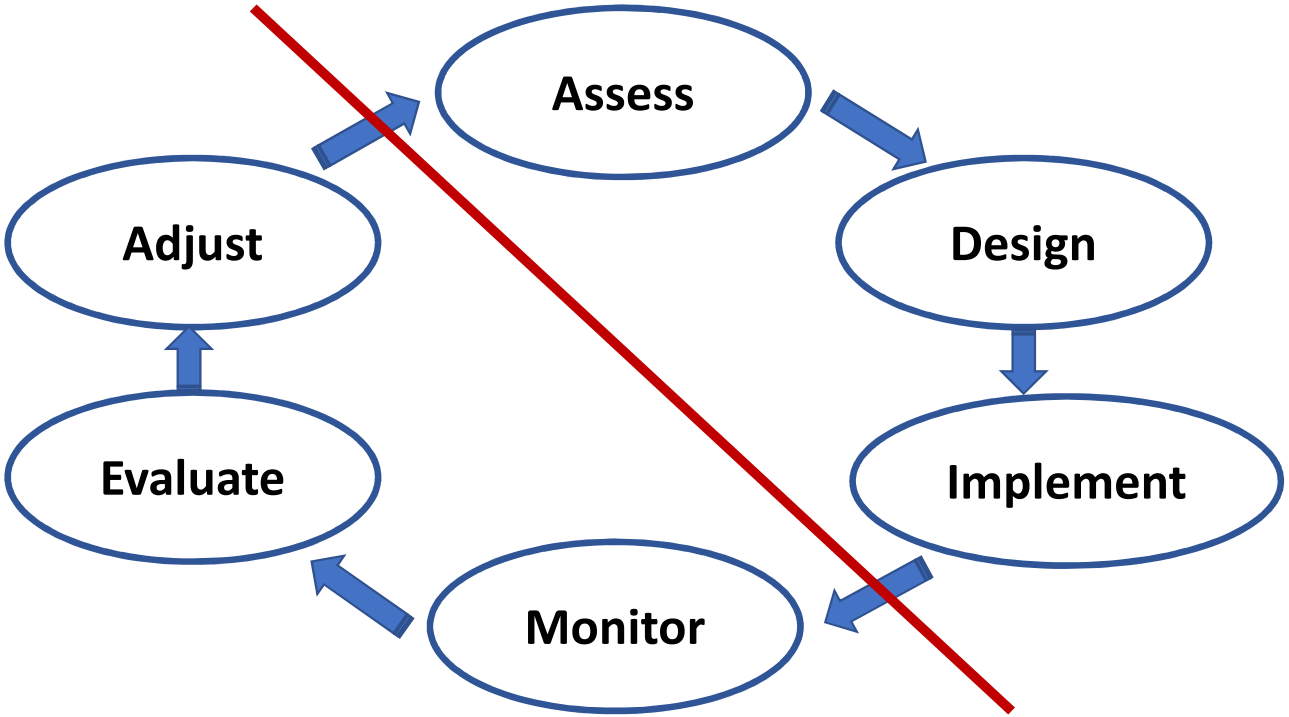
Strategy 2: Adaptive Management

Natural Resource Management

What it offers:

- **Systematic approach for improvement**; learn from management outcomes.
- **Embraces and acknowledges uncertainty.**
- **Monitors outcomes in an iterative process**—adjust management actions based on past performance.
- **Familiarity**; is a key component of the Chesapeake Bay TMDL implementation.

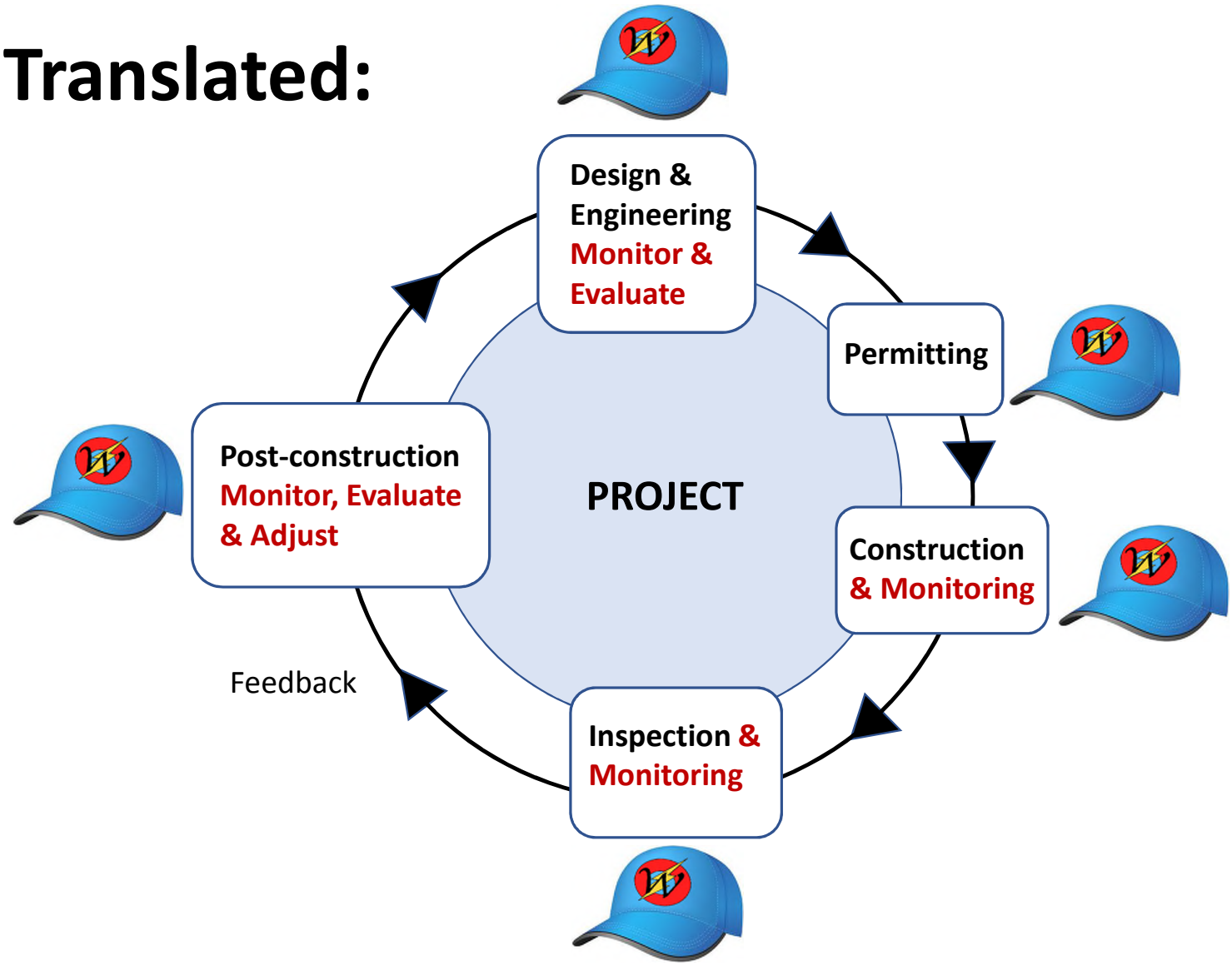
What it looks like:



Strategy 2: Establish a “Team Wholistic”

- Organized into multi-disciplinary, collaborative teams
- Includes internal staff and external contractors
- Shared knowledge base; shared investment in project success
- Monitoring and evaluation informs decision-making

Translated:


Design & Engineering Monitor & Evaluate
Permitting
Construction & Monitoring
Inspection & Monitoring
Post-construction Monitor, Evaluate & Adjust
PROJECT
Feedback

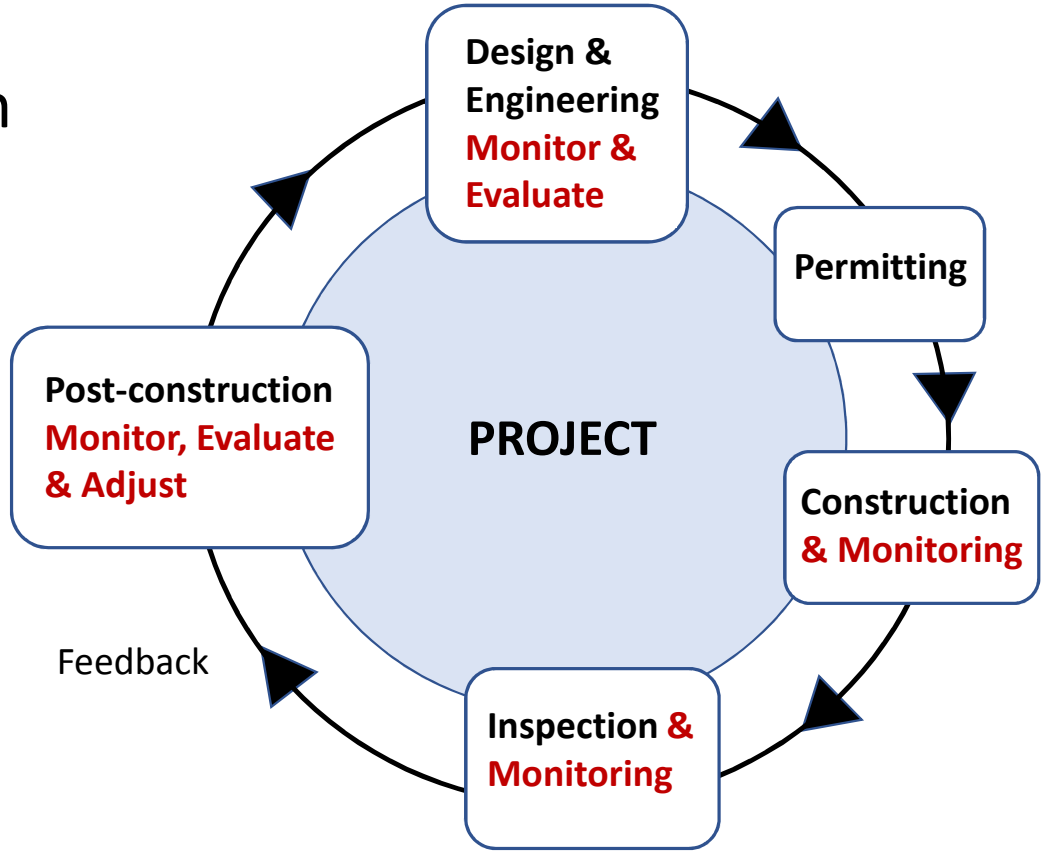
Outcomes:

- Improved coordination and collaboration = greater effectiveness
- More comprehensive data
- More efficient use of resources
- Better understanding of variation in performance over a range of conditions
- Evaluations guide better decision-making

Getting to Gestalt

The whole is greater than the sum of its parts.

- ✓ Holistic
- ✓ Comprehensive
- ✓ Collaborative
- ✓ Iterative
- ✓ Across boundaries
- ✓ Factors in uncertainty
- ✓ Continual assessment



IV. Wrap up

What thoughts or experiences can you share?

Thank you!