ARLINGTON RE-GEN

Arlington County Water Pollution Control Plant

Arlington Re-Gen

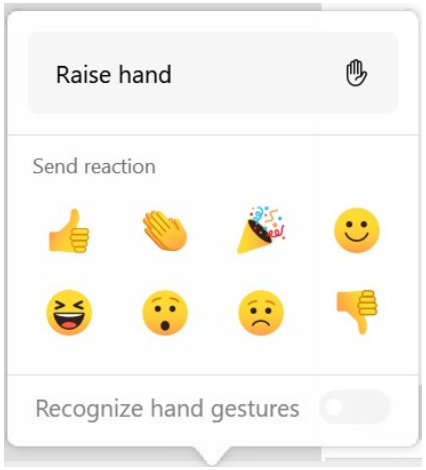
Biosolids Advisory Panel

February 12, 2024

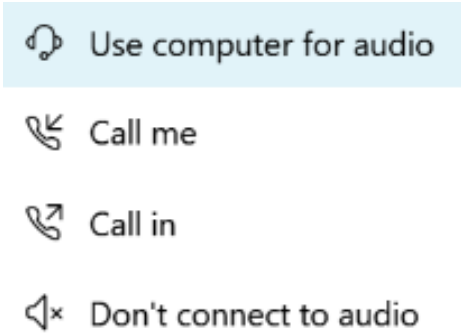
ARLINGTON VIRGINIA

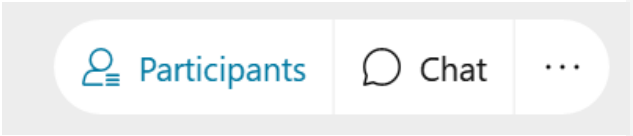
Meeting Logistics

WEBEX CONTROLS



MEETING PREVIEW AUDIO SELECTION





TO BE UNMUTED

*Click the "**Raise Hand**" button pressing ***3 on your phone***

*You can also ask to be unmuted in the "**Chat**" box*

ISSUES HEARING AUDIO?

Re-join using "Call me" Audio Selection

Introductions

Mary Strawn	**Antron Sutton**	**Lisa Racey**	**Fasil Haile**
Arlington County Water Pollution Control Bureau	Arlington County Water Pollution Control Bureau	Arlington County Water Pollution Control Bureau	Arlington County Water Pollution Control Bureau

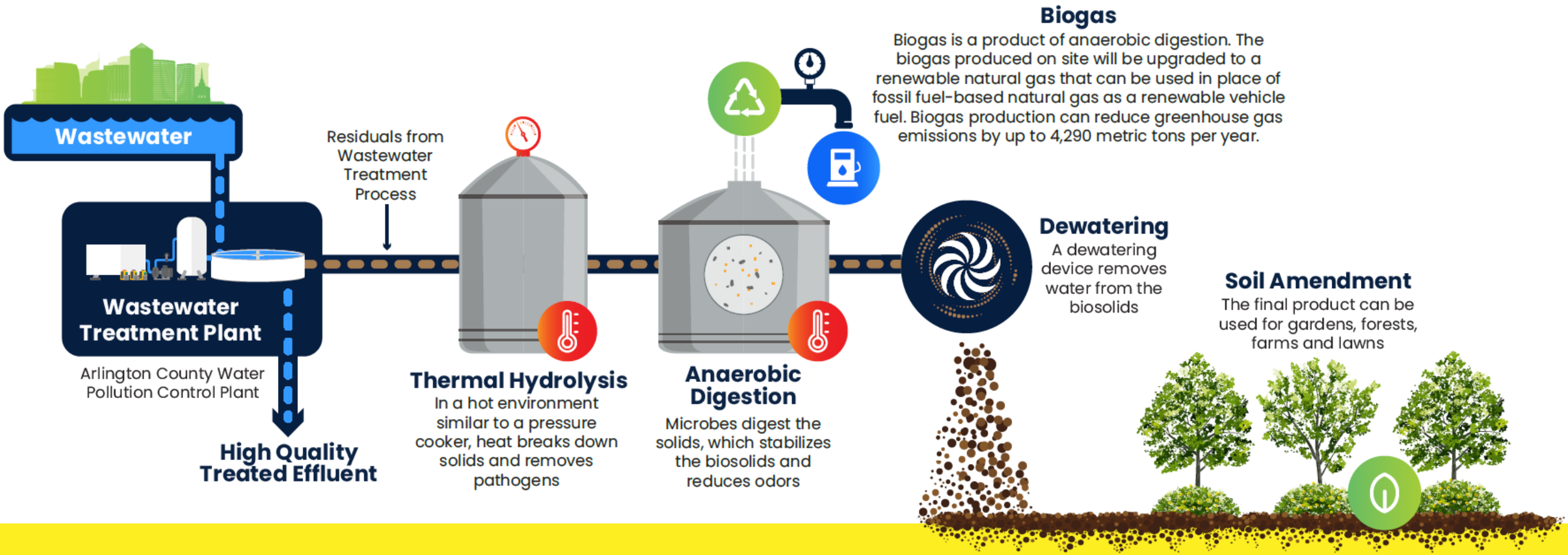
Brian Balchunas	**Stephanie Spalding**	**Jessica Host**	**Rahkia Nance**	**Dan Stromberg**
HDR	HDR	HDR	HDR	PC Project Manager

Agenda

01	6:00 – 6:05	**Introductions**
02	6:05 – 6:25	**Overall Program Updates**
03	6:25 – 6:40	**Procurement Update**
04	6:40 – 6:45	**Schedule Update**
05	6:45 – 7:05	**Envision Report Out**
06	7:05 – 7:20	**Carbon Capture**

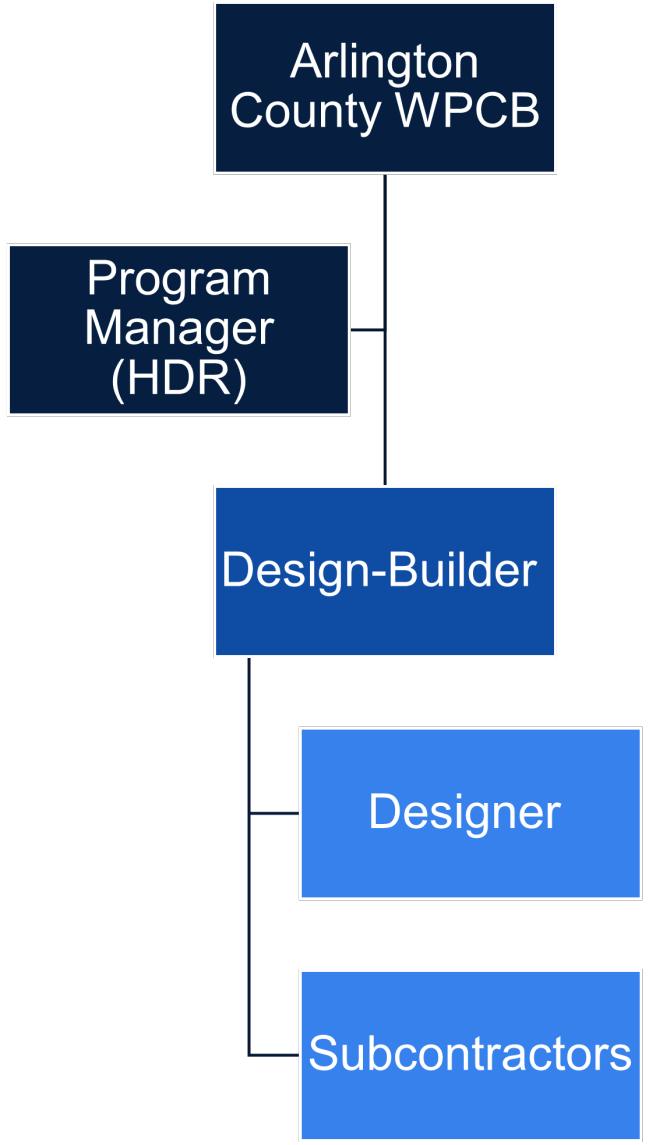
Program Overview

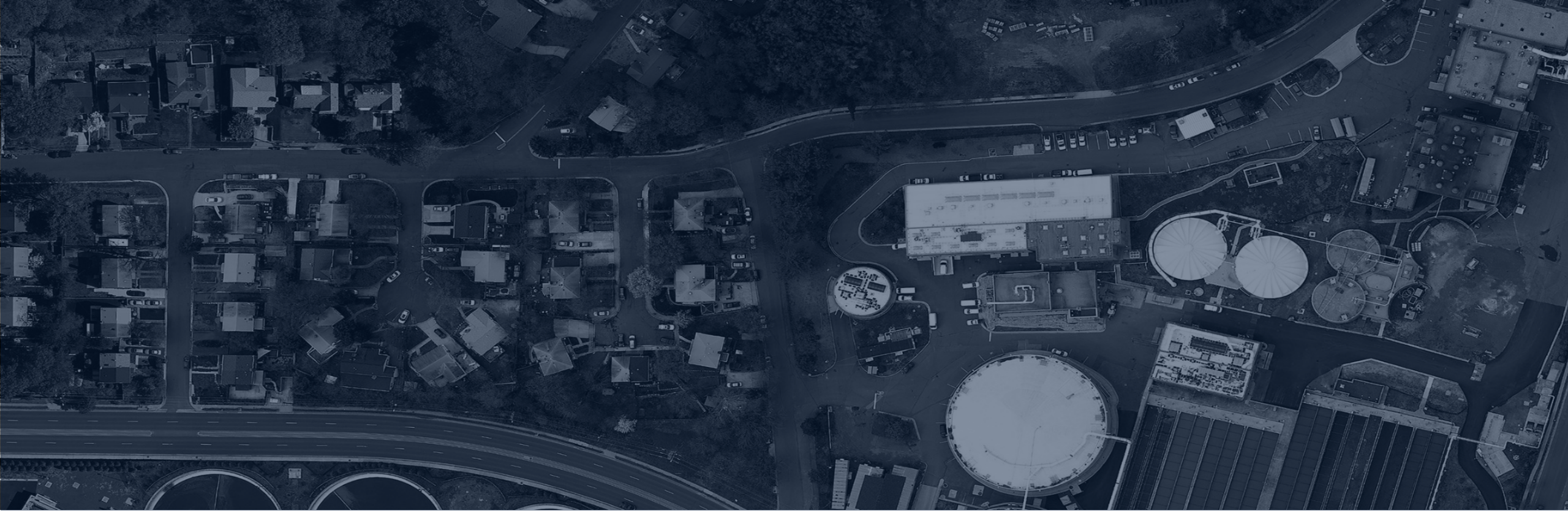
Recovering renewable resources from wastewater



HDR Roles and Responsibilities

- HDR serves as an advisor to Arlington County
- Moving to new phase:
  - Oversee design and construction
  - Assist with start-up and commissioning
- HDR is prohibited from participating in any design and construction





02

Overall Program Updates

Technical Updates

"What"

- Data Analysis
- Condition Assessment
- Technology Review
- Process Evaluations
- Gas Utilization
- Air Emissions
- Site Development
- Facilities Plan

Completed

- All preliminary technical work
- Consideration of carbon capture (discuss today)

Upcoming

- Design confirmation and detailed design

Delivery Updates

"How"

- Risk Analysis
- Project Packaging
- Delivery Evaluation
- Procurement of Delivery Teams

Completed

- Reviewed design associated with gravity thickeners
- Finalized Design Builder Selection process

Upcoming

- Continue design of gravity thickeners
- Initiate Design Build Contract

Program Components

Program Management

- Assistance with program development and oversight

Gravity Thickeners

- Rehabilitate existing gravity thickeners

Early Work Package

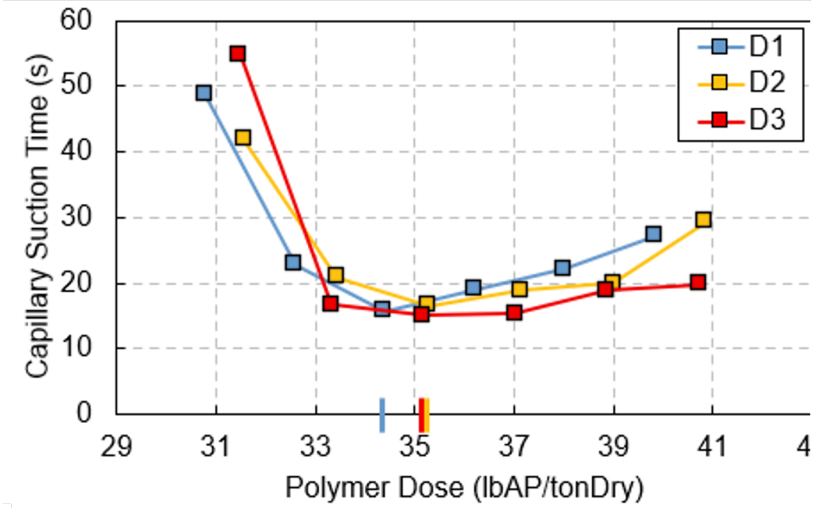
- Demolition
- Utility relocation
- Site Preparation

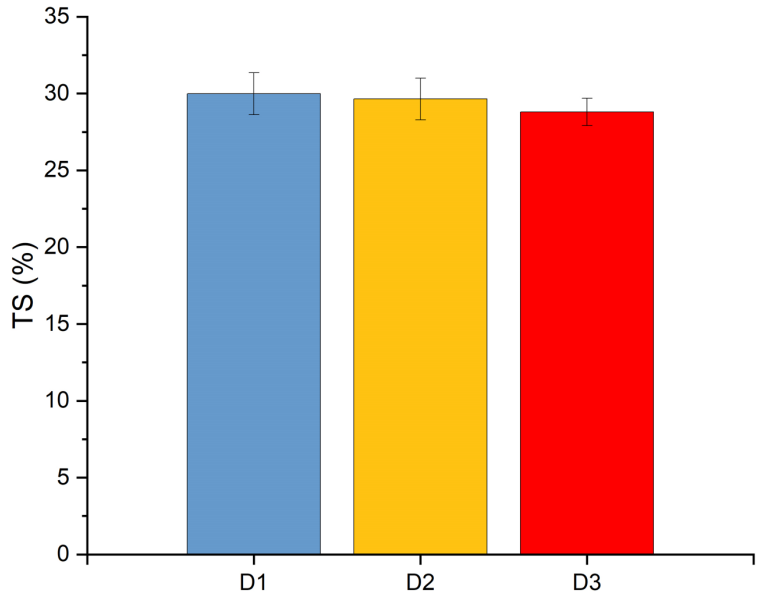
Main Work Package

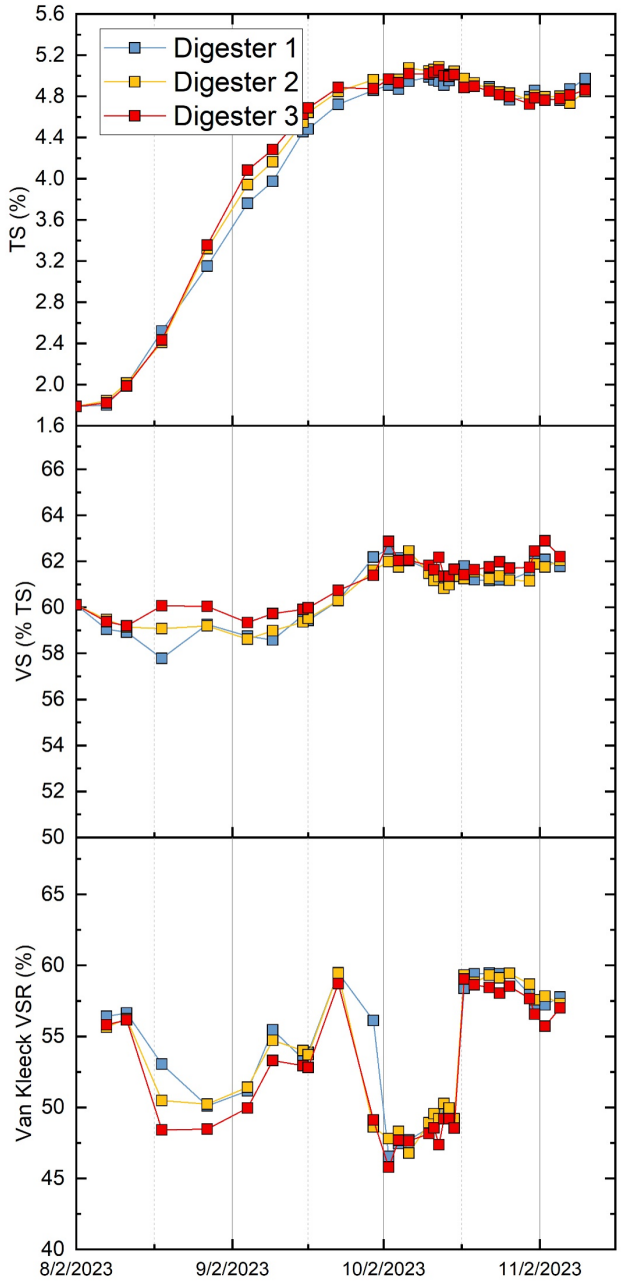
- New processes and facilities

THP Digester/Pilot

- Virginia Tech supporting research
- Results to date are positive





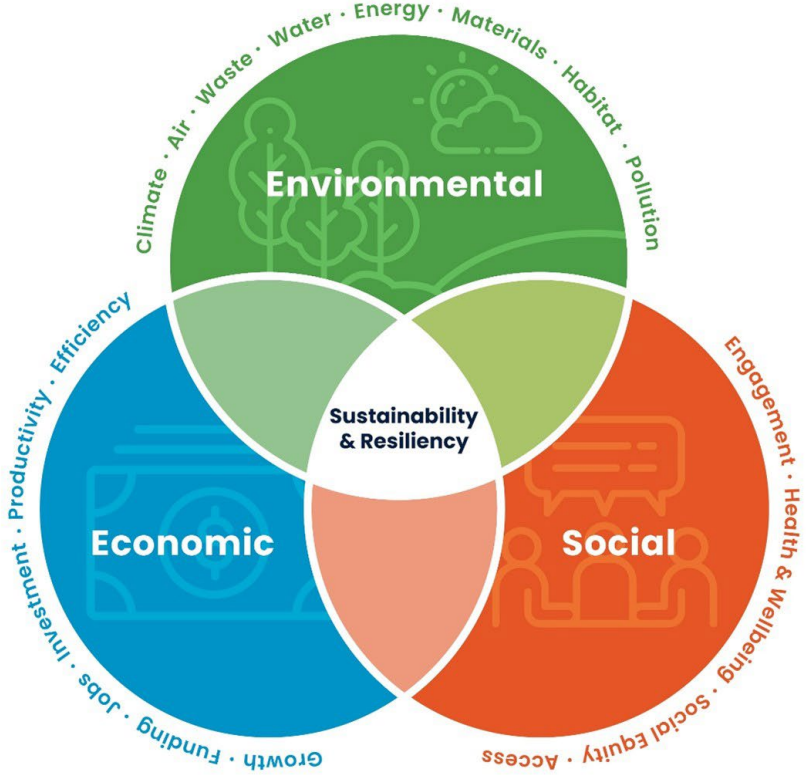


Renewable Natural Gas - Commercial

- Arlington continues to investigate potential commercial partners for marketing and disposition of environmental credits for RNG
- Request for Information (RFI) issued to better understand options
- Key goals:
  - Use RNG with ART for as long as natural gas buses are in the fleet
  - Understand that timeline is finite, so identify other outlets long-term
  - Maintain GHG credits within Arlington County
  - Identify balanced risk and revenue profile

ArlingtonReGen.com Update

- January blog post features Envision
- Explains each of the five categories
- Invites readers to learn more



Rock N' Recycle

National Association of Clean Water Agencies' 2024 National Environmental Achievement Award

Learn more at arlingtonregen.com

Good Neighbor = Open Communication

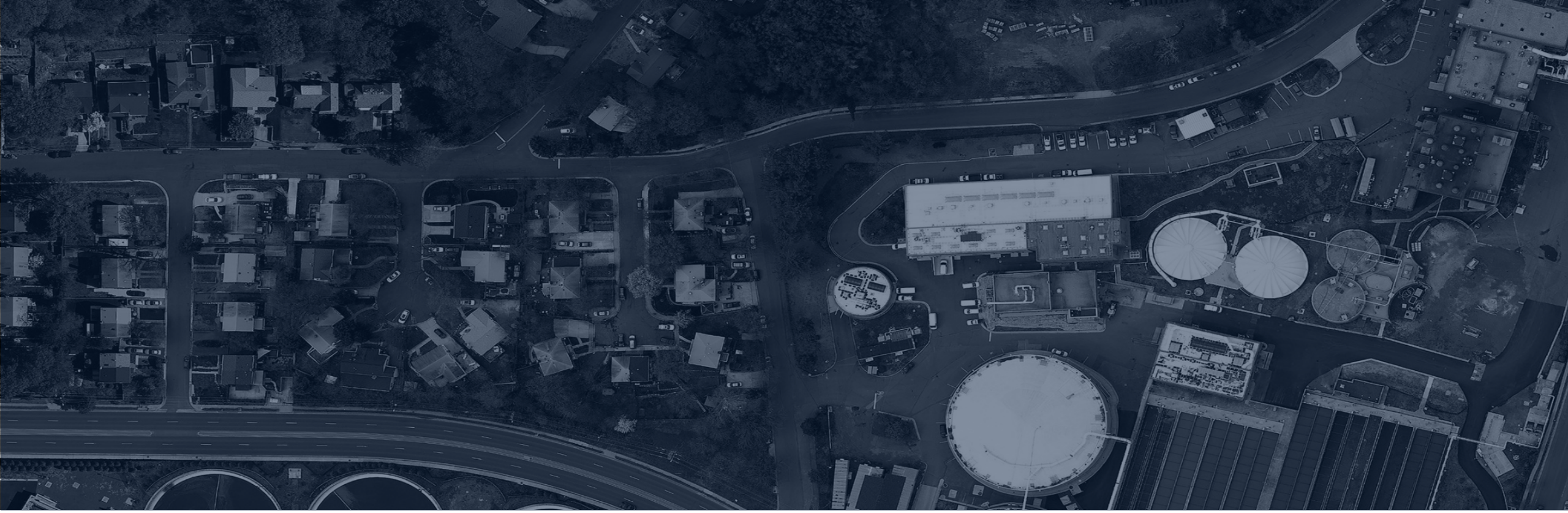
- Paul and Sandra have shared WPCP staff's contact with neighbors experiencing issues
  - Resolved one issue by adjusting equipment on site
  - Resolved second issue by educating resident on the odor source* and suggesting ways to mitigate

- WPCP staff can coordinate with Water, Sewer, and Stormwater teams to resolve questions as they arise

*odor did not originate from the plant

Funding Updates

- Capital Improvement Plan (CIP)
  - Updates have been submitted to the County Manager
  - Increase reflects normal escalation over the last 2 years plus adjustment for construction market volatility
  - Going through bi-annual review process
- Inflation Reduction Act Tax Credit
  - Potential to act as a grant toward the project
  - Compliance with additional administrative requirements that are not necessary with traditional funding
  - Working through process to confirm suitability
- Other funding/financing sources (such as WIFIA) may be possible

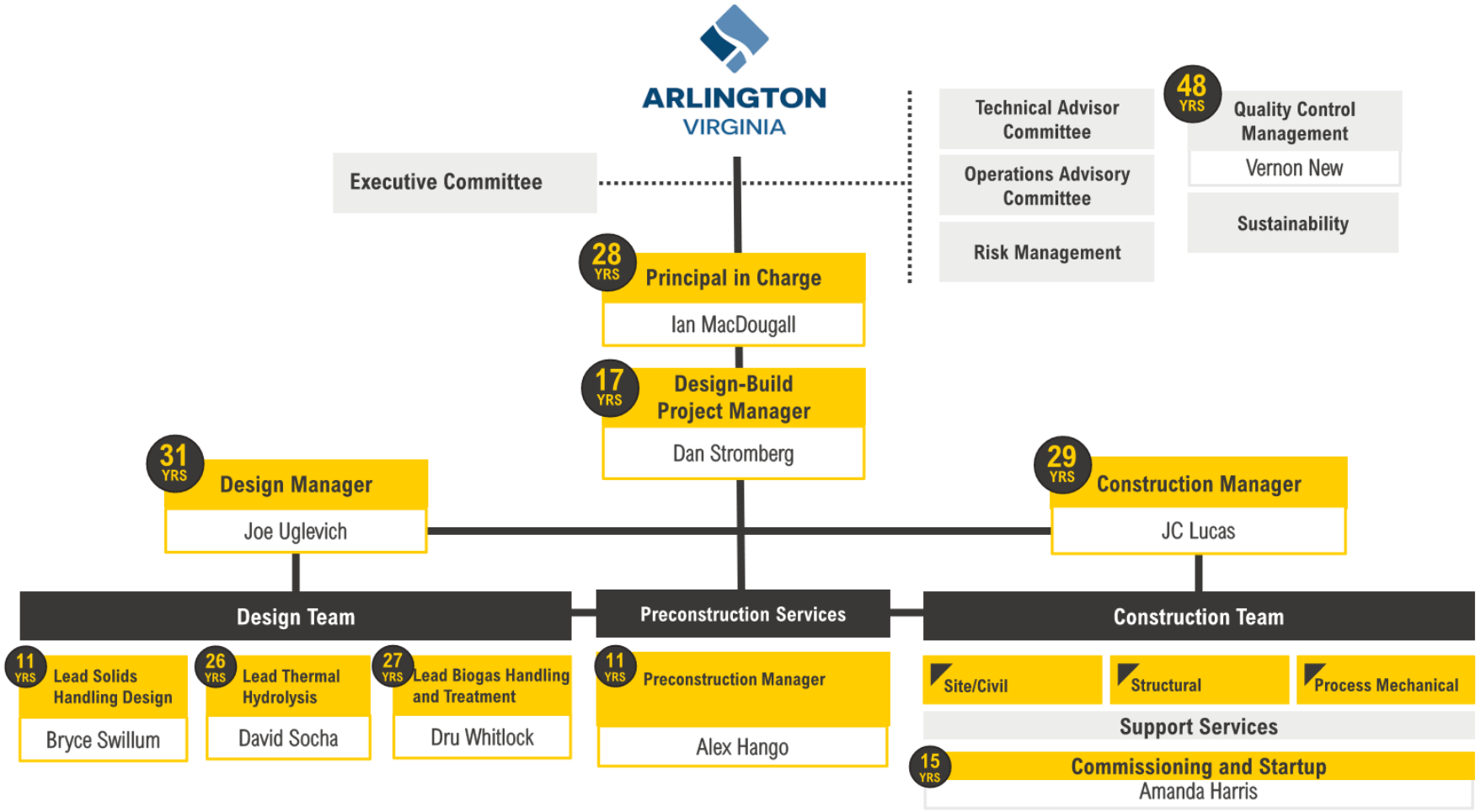


03
Procurement Update

Design Build Procurement

- Request for Qualifications Issued in June 2022
- Three firms were deemed prequalified
- All three firms responded to Request for Proposals in May 2023
- Interviews held in June 2023
- Negotiations August – December 2023
- Award to PC Construction approved at County Board Meeting on January 20, 2024

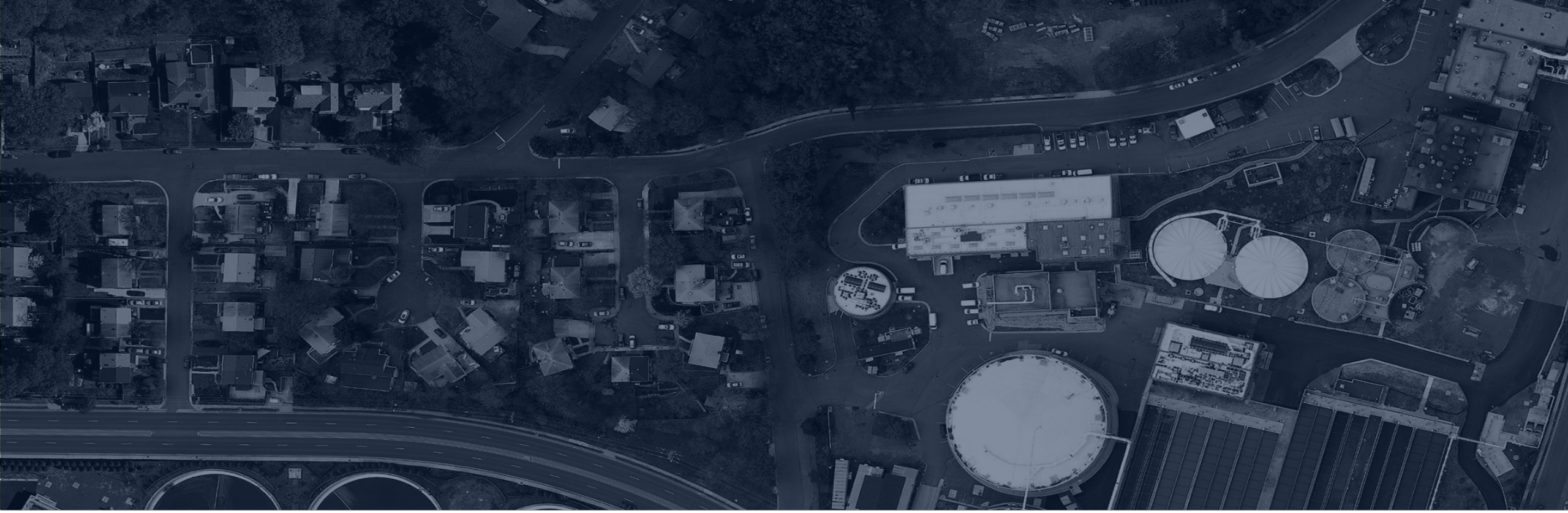
Dan Stromberg – PC Project Manager



Similar Project Experience

Arlington Water Pollution Control Plant

WSSC Piscataway WRF

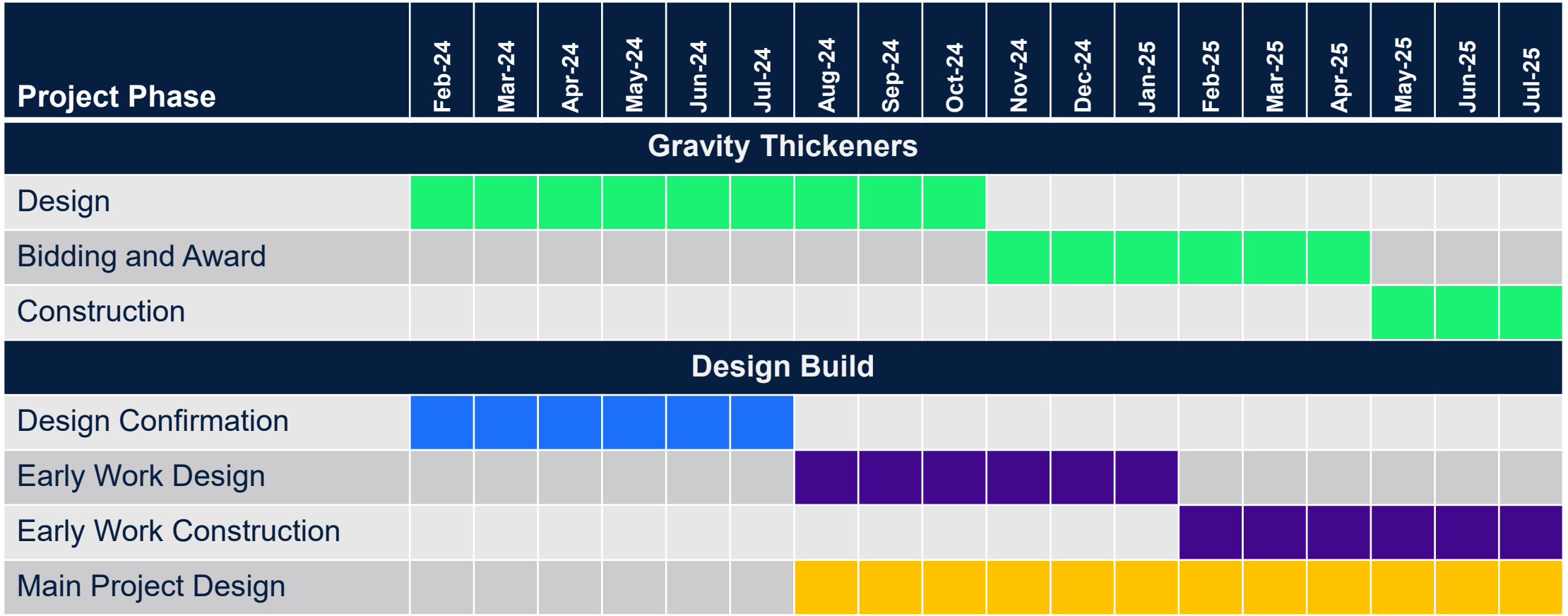


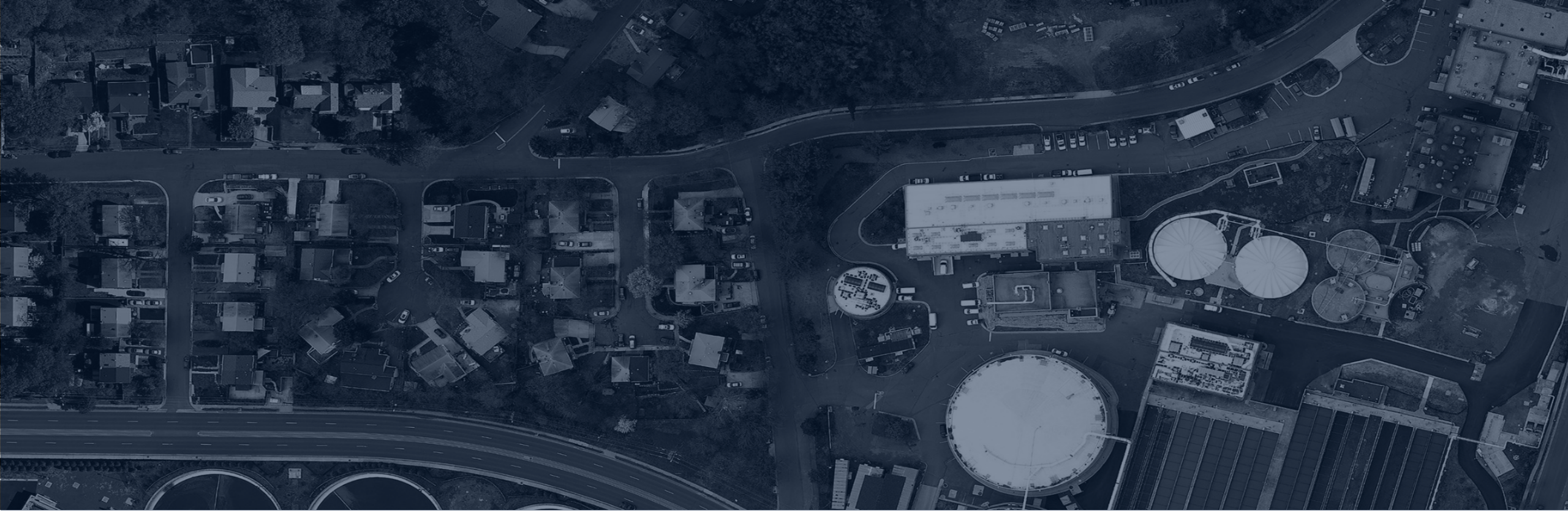
04
Schedule Updates

Tentative Program Timeline

Program Management	Facilities Plan Biogas Utilization	Facilities Plan Procurement	Procurement Design Oversight	Design and Construction Oversight	Design and Construction Oversight	Construction Oversight	Construction Oversight	Start-up Assistance	Start-up Assistance
Gravity Thickeners	--	--	Design	Design	Construction	Start-up			
Early Work	--	--	--	Design and Construction	Construction				
Main Work Package	--	--	--	Design	Design	Construction	Construction	Construction Check-out	Start-up

Near Term Project Schedule





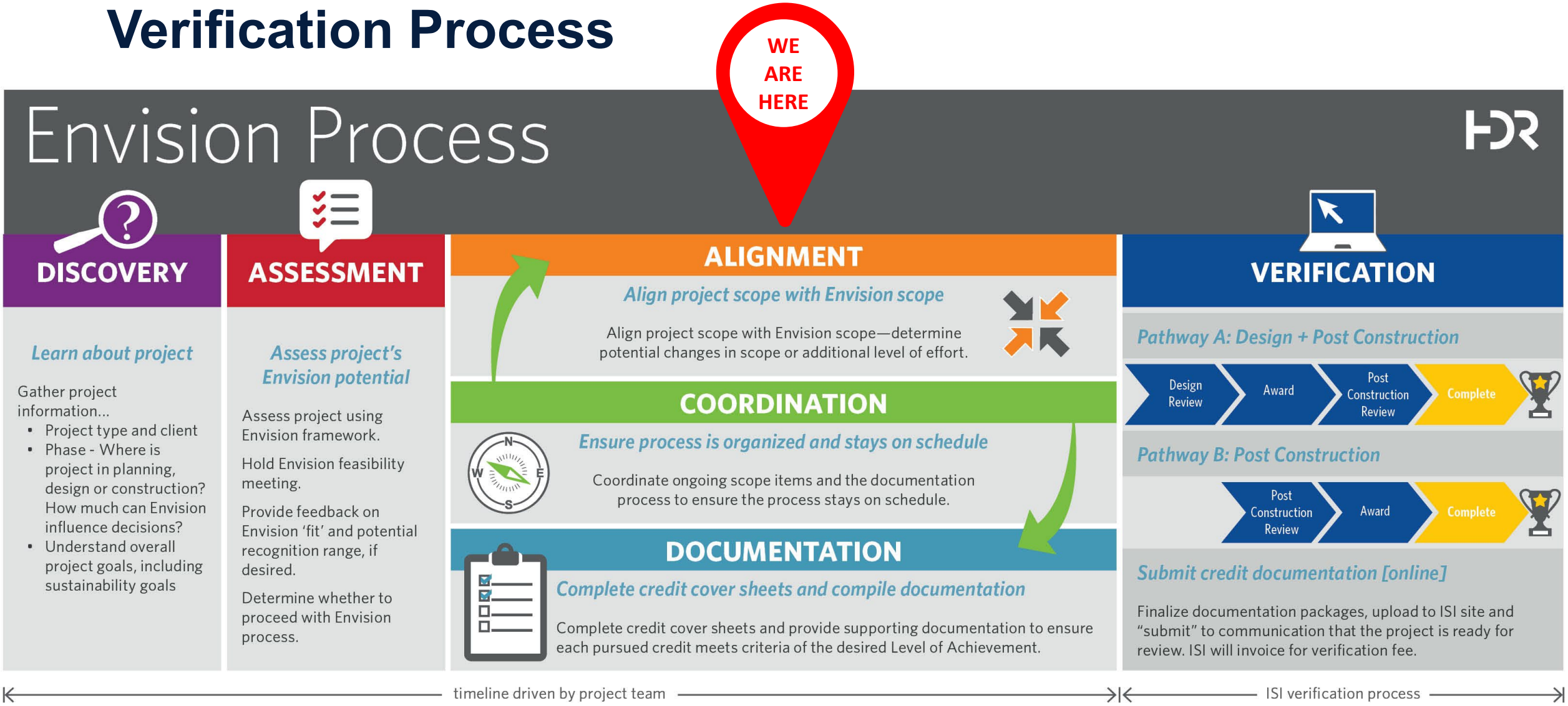
05
Envision Report Out

Quality of Life	Well-being • Mobility • Community
Leadership	Collaboration • Planning • Economy
Resource Allocation	Materials • Energy • Water
Natural World	Siting • Conservation • Ecology
Climate & Resilience	Emissions • Resilience

Program Sustainability Goals with Envision Alignment

	Re-Gen Goals	County Goals
Reduce operating costs	✓	✓
High-performing and efficient project	✓	✓
Support staff and community health	✓	✓
Environmental, economic, and social stewardship	✓	✓
Carbon-neutral by 2050	✓	✓
Open, transparent, and collaborative process	✓	
Class A biosolids and biogas for renewable energy	✓	

Verification Process



Note: ISI verifies Envision projects, USGBC certifies LEED projects

Envision Credits and Points

Categories	# Credits	Max Points
Quality of Life	13	200
Leadership	11	182
Resource Allocation	13	196
Natural World	13	232
Climate & Resilience	9	190
Totals	59	1,000

Category Summary – Current Status

Category	Max Points	Applicable Points*	Low Estimate	%	High Estimate	%
Quality of Life	200	182	106	58%	121	66%
Leadership	182	182	135	74%	150	82%
Resource Allocation	196	196	81	41%	83	42%
Natural World	232	100	35	35%	35	35%
Climate & Resilience	190	174	96	55%	127	73%
Total	1000	834	453	54.3%	516	61.9%

Envision Recognition Levels

Natural World Credit Summary

Must provide a clear justification if a credit is identified as not applicable to a project for exclusion.

CATEGORY	SUB-CATEGORY	CREDIT NAME/NUMBER	Not Applicable	LEVEL OF ACHIEVEMENT					
				None	Improved	Enhanced	Superior	Conserving	Restorative
NATURAL WORLD	SITING	NW1.1 Preserve Sites of High Ecological Value	-22	0	2	6	12	16	22
		NW1.2 Provide Wetland and Surface Water Buffers	-20	0	2	5	10	16	20
		NW1.3 Preserve Prime Farmland	-16	0	-	2	8	12	16
		NW1.4 Preserve Undeveloped Land	0	0	3	8	12	18	24
	CONSERVATION	NW2.1 Reclaim Brownfields	-22	0	11	13	16	19	22
		NW2.2 Manage Stormwater	0	0	2	4	9	17	24
		NW2.3 Reduce Pesticide and Fertilizer Impacts	0	0	1	2	5	9	12
		NW2.4 Protect Surface and Groundwater Quality	0	0	2	5	9	14	20
	ECOLOGY	NW3.1 Enhance Functional Habitats	-18	0	2	5	9	15	18
		NW3.2 Enhance Wetland and Surface Water Functi	-20	0	3	7	12	18	20
		NW3.3 Maintain Floodplain Functions	-14	0	1	3	7	11	14
		NW3.4 Control Invasive Species	0	0	1	2	6	9	12
		NW3.5 Protect Soil Health	0	0	-	3	4	6	8
		NW0.0 Innovation *(earn up to 8 points)*		0					

Maximum NW Points	232	100
Excluded (n/a)	-132	
High	35	*35.0%*
Low	35	*35.0%*

Envision Guidance Manual Structure – Credit

Credit # and title

Intent: Purpose of the credit

Max Points

Levels of Achievement

Description Details on purpose and objectives; why credit is important

Performance Improvement Getting to the next LOA

Metric: How the credit will be measured

Related Credits

Evaluation Criteria & Documentation
Criteria questions with potential documentation sources noted beneath. Provide sufficient documentation to answer the criteria questions and demonstrate achievement

QUALITY OF LIFE: MOBILITY

QL2.1 Improve Community Mobility and Access

14 POINTS

INTENT
Plan the project as part of a connected network that supports all transportation modes for the efficient movement of people, goods, and services.

METRIC
The extent to which the project broadens mode choices, reduces commute times, reduces vehicle distance traveled, and improves levels of service.

LEVELS OF ACHIEVEMENT

IMPROVED	ENHANCED	SUPERIOR	CONSERVING	RESTORATIVE
A + B	A + B + C	A + B + C + D	A + B + C + D + E	A + B + C + D + E + F
(1) Satisfactory Coordination	(3) Controlled Access	(7) Increased Access and Flow	(11) Connected Networks	(14) Restoring Community Connections

(A) The project team demonstrates consistency with local and regional transportation plans.

(B) The project team obtains input from the community and key stakeholders (e.g., public officials and operators of adjacent facilities, amenities, or transportation hubs) regarding improved access.

(C) The project includes strategies to increase capacity, manage congestion, reduce vehicle distance traveled, or lower accident rates

(D) The project team works with the community to expand mobility and access options and/or incorporate complete streets policies.

(E) The project addresses long-term mobility and access needs of the community.

(F) The project creates new or restores previous connections between communities.

DESCRIPTION

This credit addresses community mobility as a connected network for all modes, including private automobile usage, and focuses on the broader community benefits achieved from the efficient movement of people, goods, and services. It assesses quality-of-life benefits that mobility provides through greater access to jobs, education, and critical services. These include reducing commute times, reducing vehicle distance traveled, or improving levels of service.

Greater mobility provides freedom of choice when it comes to access to education, jobs, affordable housing, and even healthy food and activities. Barriers and impediments to mobility are also a source of discontent within communities. This can often be found calculating the loss of economic activity due to congestion.

Projects should consider how even non-transportation projects can become multi-benefit projects by contributing to more efficient mobility in the community. This may include how site access is configured, the mode with which it is accessed, or the frequency of trips to and from the site. For example, a park that incorporates a pedestrian overpass can improve the mobility of both cars and pedestrians.

PERFORMANCE IMPROVEMENT

The assessment of mobility in this credit is scalable, and expectations regarding the geographic scope of the assessment are relative to the scale of the project. For example, large rail projects might assess mobility across an entire region, while a small park project may assess mobility to and from local neighborhoods.

Improved: The project is consistent with local transportation plans that were developed and adopted through an inclusive public involvement process. Wherever possible, the project should consider its relationship to nearby housing, employment, shops and community facilities. The project team demonstrates a reasonable, inclusive, and coordinated approach to addressing mobility impacts.

Enhanced: Overall mobility is enhanced with a connected network that helps reduce congestion, improves traffic flow, and/or contributes to community livability. Project teams implement strategies to accommodate or support automobile, transit, and commercial vehicles while promoting complete streets policies leading to more active, healthier lifestyles. With the increasing role of technology, project teams should consider ways to utilize open data to enhance project performance.

Conserving: The project team is proactive in identifying the limitations and future mobility needs of the community and incorporating strategies to address them.

Restorative: The project creates or restores community connections. Beyond improving existing performance, the project has created new mobility opportunities with potentially cascading benefits (e.g., better access to schools, commercial districts, healthcare, etc.).

Applicability: Consideration is given to whether the project has any potential to impact mobility. Non-transportation projects that do not include any mobility impacts (positive or negative), and can demonstrate no potential for positively impacting mobility, may apply to have this credit deemed not applicable with supporting documentation. This credit is inherently applicable to all transportation infrastructure projects.

EVALUATION CRITERIA AND DOCUMENTATION GUIDANCE

A. Is the project consistent with local transportation plans?

1. *Documentation demonstrating consistency with local and regional transportation plans. When applicable, documentation may include an amendment to the transportation plan(s).*

B. Has the project team obtained input from the community and key stakeholders regarding issues of mobility and access?

1. *Documentation (e.g., reports, memoranda, and/or minutes) of meetings with the community and key stakeholders (e.g., community officials or managers and operators covering access to adjacent facilities, amenities, and transportation hubs).*
2. *Records of decisions made and actions taken.*

C. Does the project include strategies to increase capacity, manage congestion, reduce vehicle distance traveled, or lower accident rates?

1. *Reports documenting access and mobility principles, concepts, requirements, and expected outcomes of the project.*
2. *Documentation of how the project increases transportation capacity, efficiency (e.g., reduced congestion and/or vehicle distance traveled), or safety (lower accident rates).*

D. Has the project team worked with the community to expand mobility and access options and/or incorporate complete streets policies?

1. *Assessment of the availability, feasibility, and use of transportation options (e.g., rail, water, active transportation, or mass transportation access).*
2. *Documentation of how the project expands mobility and access options, including a rationale for making or not making changes to transportation modes.*
3. *When applicable, reports demonstrating the use of complete streets policies and guidelines.*

E. Has the project team considered the long-term mobility and access needs of the community?

1. *Documentation of the long-term mobility and access needs of the community (e.g., existing studies, reports, memoranda, and/or minutes).*
2. *Design components showing the extent to which long-term mobility and access needs and issues were incorporated into the constructed work. For example, expanding considerations to anticipated traffic flows and volumes, changes in technology, preferred modes of access, and effects on mobility and connectivity.*
3. *Documentation showing how the project addressed the community as a connected network, including long-term transportation infrastructure efficiency, walkability, and incentivized transportation efficiency.*

F. Does the project create new or restore previous connections between communities?

1. *Documentation of meetings with community officials discussing the need for new connections/reconnections between communities (e.g., reports, memoranda, and/or minutes).*
2. *Documentation of how the project provides new or improved connections between communities in order to increase overall mobility. For example, connecting housing, jobs, shops, and/or community facilities by utilizing or improving existing transportation infrastructure.*

RELATED ENVISION CREDITS

QL1.1 Improve Community Quality of Life

QL3.1 Advance Equity and Social Justice

Summary

- Arlington Re-Gen is the first project where County is using the Envision framework
- Action items from 10/18:
  - Natural World credits: Review habitat opportunities as site plan is refined/finalized with Design/Build Team

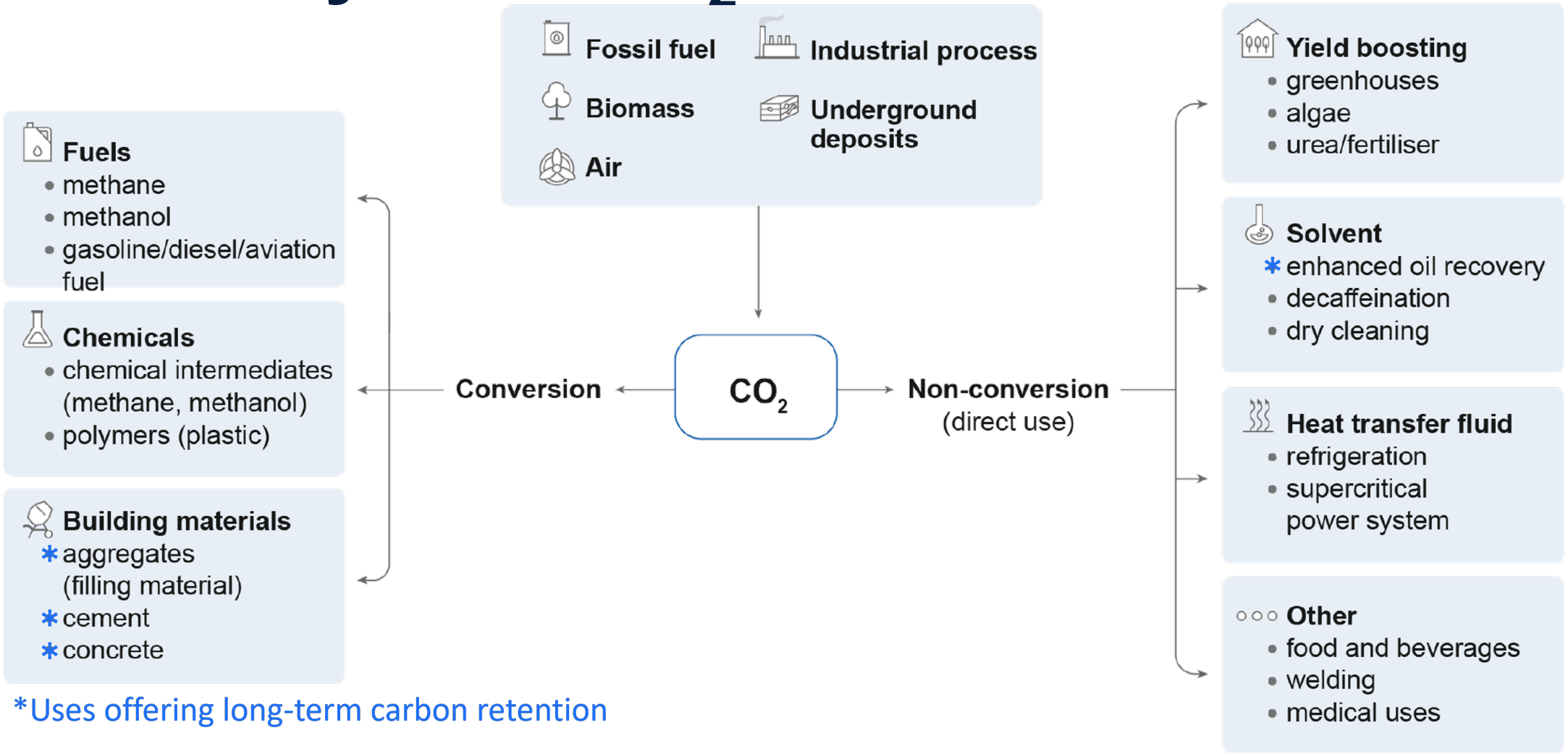
05

Carbon Capture

Purpose

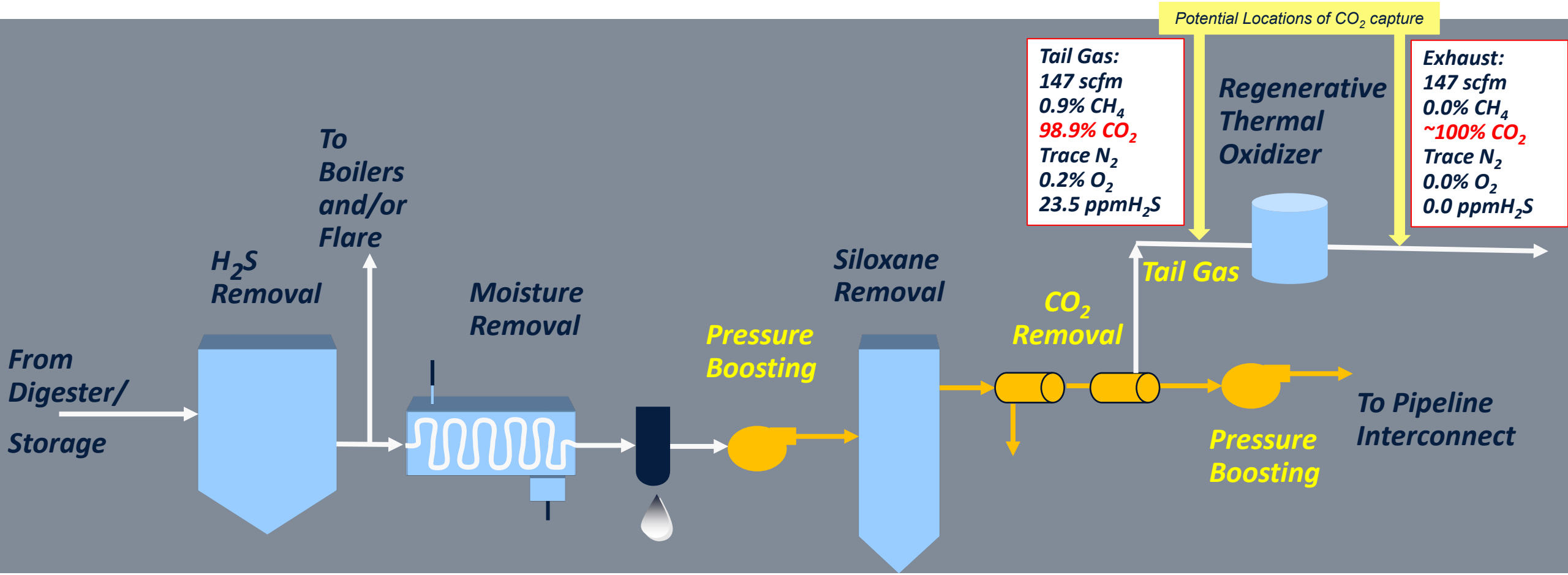
- Evaluate potential for CO_2 capture from biogas upgrading system
- Capture is not part of the Re-Gen Program – evaluation was for state of market maturity and potential future implementation

Pathways for CO_2 use



*Uses offering long-term carbon retention

Carbon Capture in RNG Process



CO_2 Purification

- Follow-up process to Membrane biogas upgrading
- Produces liquid CO_2 at purity > 99.9% and transportation pressures
- Estimated CO_2 from Arlington WPCP tail-gas is 11 tons per day
- Estimated available in the US Markets by 2024-2025

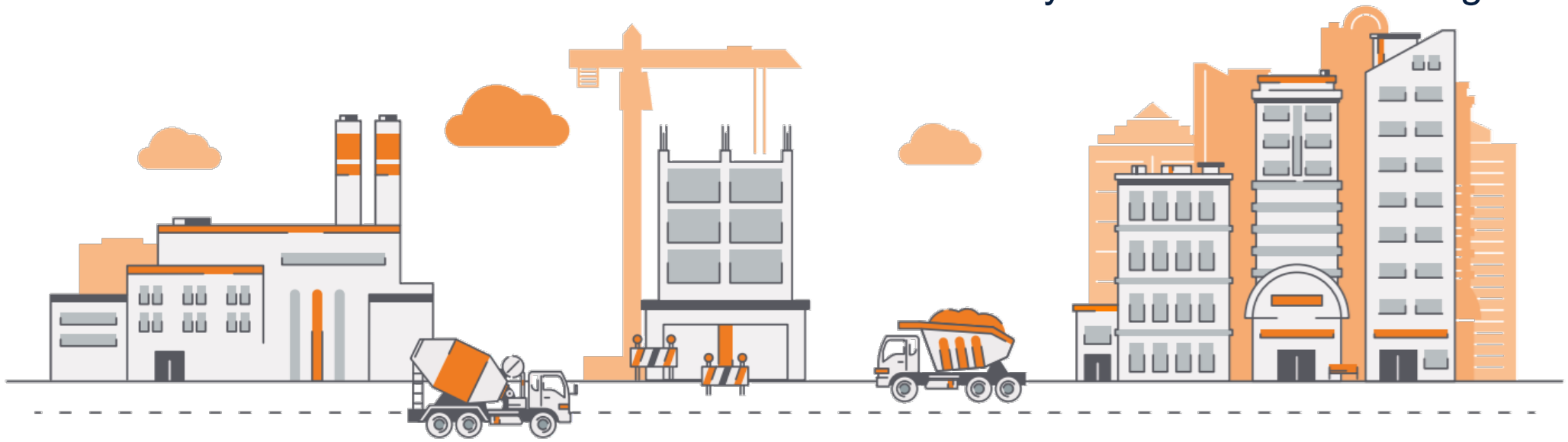
Pentair BioCO_2 Installations				
Client	**Location**	**Startup**	**Feedstock**	**CO_2 captured (tons/day)**
Aseagas Corporation	Philippines	March 2016	Bioethanol	43
Apsley Farms	Andover, UK	June 2016	Energy crop	38
Crofthead Farm	Crocketford, UK	March 2021	Energy crop	28
Brinklow Biogas	Brinklow, UK	March 2023	Food waste	16
Pretoria Energy Company	Chittering, UK	September 2023	Energy crop	38

Identified local end users

Possible User	Product/Purpose
Local Distributors	Range of CO_2 products including beverage grade, medical grade, welding, industrial, cryogenic, dry ice Offer bulk and 'microbulk' liquid CO_2 delivery *Both Lower and Higher CO_2 purity required*
Cement Manufacturer	CO_2-cured concrete *Lower CO_2 purity required*

Example End-use: CO_2-Cured Concrete

- Relatively mature and promising use option
- Two major companies: CarbonCure and Solida
- Long-term CO_2 sequestration (20-35 lb CO_2 sequestered per CY of concrete)
- Case study: Amazon HQ2 in Arlington



1. Waste CO_2 emissions are collected from local industrial emitters by gas companies and then purified.
2. The purified CO_2 is stored onsite at the concrete plant and connected to CarbonCure's technology.
3. CarbonCure's technology injects CO_2 into the fresh concrete to create high-performing, low-carbon concrete.
4. Private and public projects are built with CarbonCure concrete, reducing embodied carbon in new buildings.

CARBON CURE

(Graphic: CarbonCure)

Arlington Re-Gen CO_2 Capture

- Estimated daily CO_2 quantities
  - Mass: About 11 tons per day (small producer)
  - Liquid: About 2600 gallons (one truck)
  - ~ $4 million in equipment costs
- Market will continue to be monitored

Next Steps

- Next meeting in Summer/Fall 2024
  - Aligns with Design Confirmation
  - Agenda topics TBD

Project Contact

Mary Strawn
Chief Engineer
Arlington County Water Pollution Control Bureau
(703) 228-6829
MStrawn@arlingtonva.us

Thank you!