

Organic Waste to Fuel Potential Pilot Project Short-List Screening Workshop

**North Central Texas Organic Waste to
Fuel Feasibility Study**

**Project Advisory Group
August 30, 2022**



AGENDA



Project Advisory Group Update



Project Status Update



Pilot Project Short-List Screening



Discuss and Finalize Short List



Next Steps

Virtual Workshop Reminders

1

Please leave your microphone muted unless speaking

2

Use the chat box or raise hand button to ask a question or provide a comment

3

Please state your name prior to asking a question or making a comment

4

Please note that the presentation is being recorded

Anaerobic Digestion (AD)

Water Resource Recovery Facility (WRRF)

Landfill Gas (LFG)

Landfill Gas to Energy (LFGTE)

Renewable Natural Gas (RNG)

Natural Gas Vehicle (NGV)

Renewable Fuel Standard (RFS)

Environmental Credits

Key Terms and Acronyms

WELCOME & INTRODUCTIONS

Introductions

- ▶ **Breanne Johnson**
Environment & Development Planner
NCTCOG
- ▶ **Lori Clark**
Air Quality Program Manager
NCTCOG
- ▶ **Soria Adibi**
Senior Air Quality Planner
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- ▶ **Melanie Sattler**
Civil Engineering Professor & Researcher
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Introductions



Scott Pasternak

Project Manager
Burns & McDonnell



Scott Martin

Deputy Project Manager
Burns & McDonnell



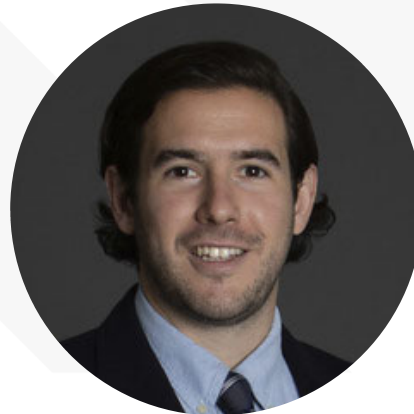
Debra Kantner

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Project Advisory Group Update



- ▶ James Keezell, City of Fort Worth
- ▶ Katelyn Hearon, City of Lewisville
- ▶ Kathy Fonville, City of Mesquite
- ▶ Jaime Bretzmann, City of Plano
- ▶ Brendan Lavy, Texas Christian University
- ▶ Courtney Carroll, Fort Worth ISD
- ▶ Sahana Prabhu, Texan by Nature
- ▶ Lynn Lyon, US Gain

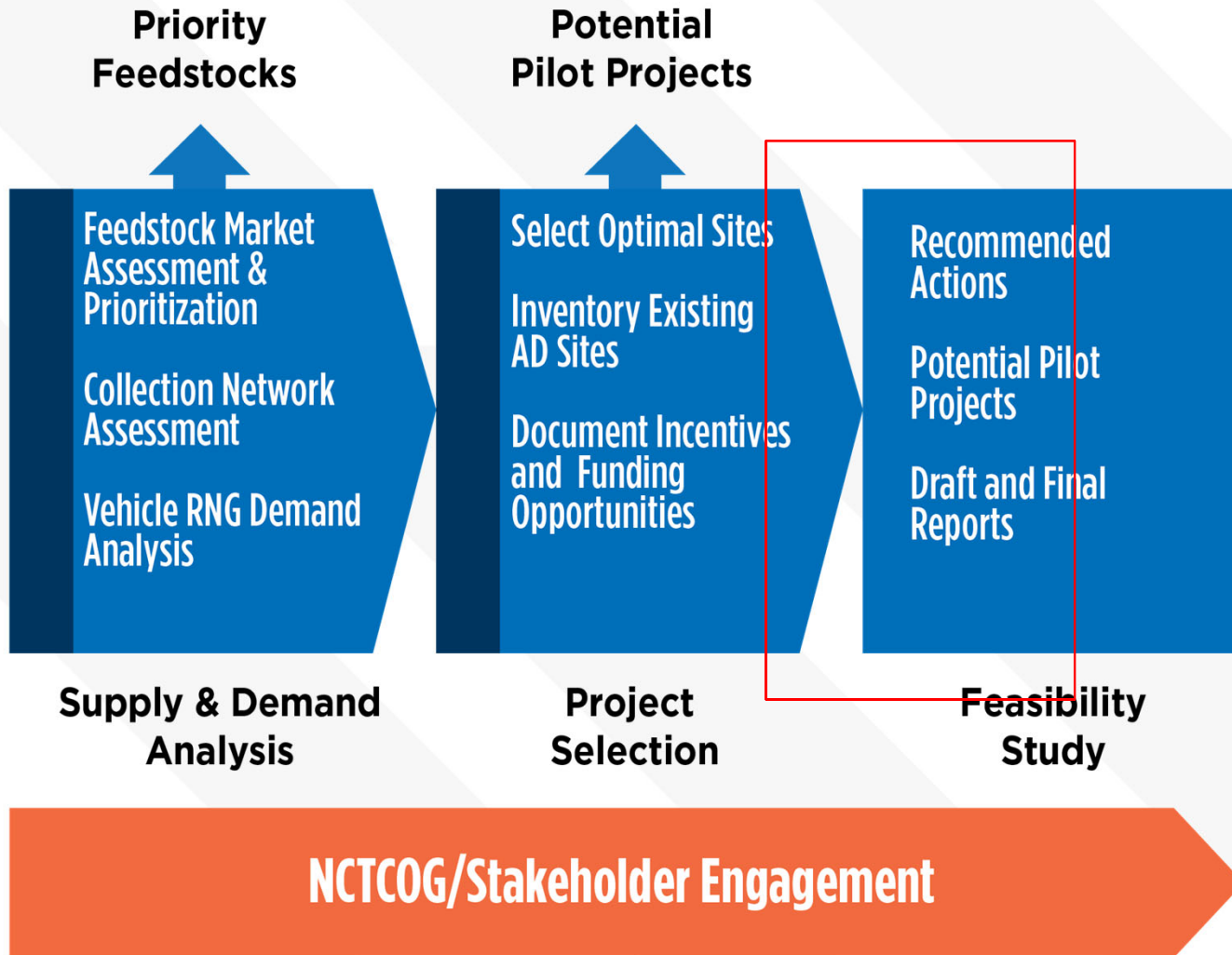
PROJECT STATUS UPDATE

Project Background

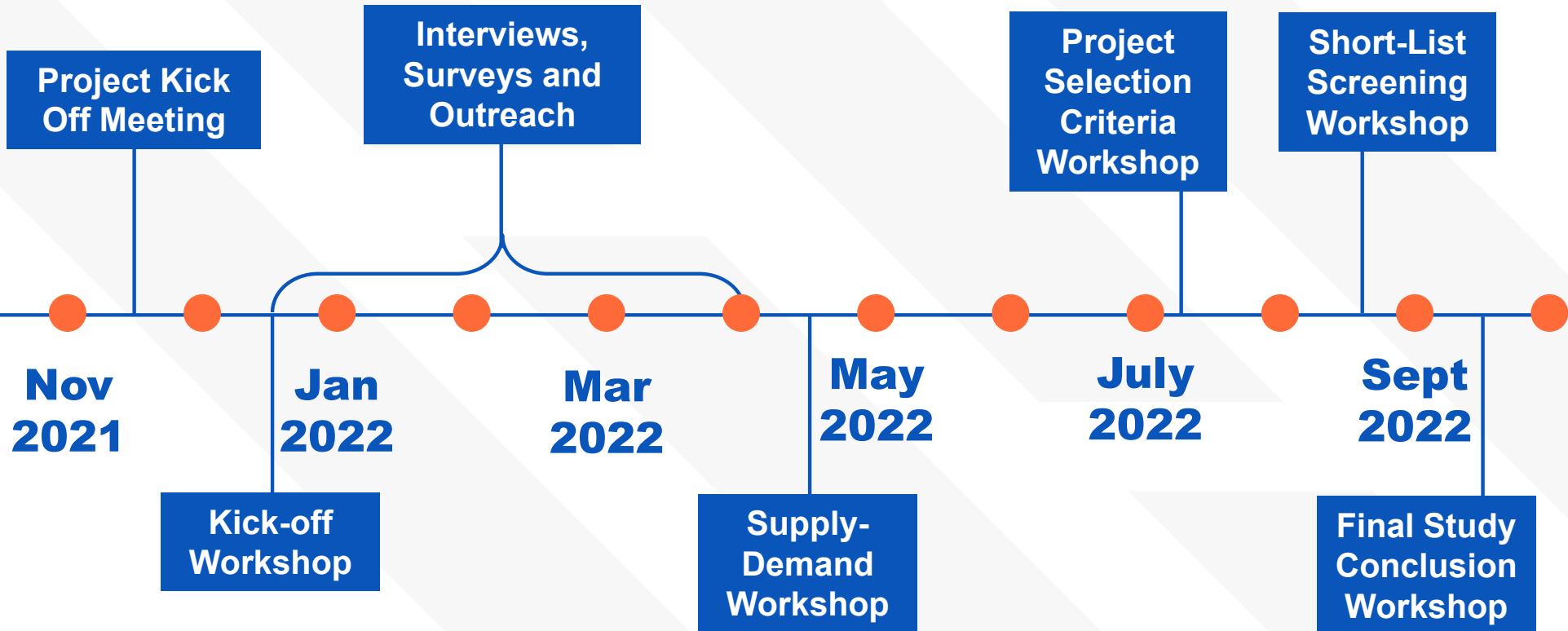


- ▶ Study assess the feasibility of collecting and transporting organic wastes to produce renewable natural gas (RNG) for use as a transportation fuel.
- ▶ NCTCOG and UTA partnering on the study which is supported by a grant from the U.S. Environmental Protection Agency (U.S. EPA).
- ▶ Prior to the study, NCTCOG conducted regional waste characterizations and a series of virtual roundtables to share organic waste management efforts and challenges in the region.
- ▶ Key considerations for the evaluation include determining the most critical organic wastes to divert (e.g., sludge and biosolids, food waste, FOG) from disposal at MSW landfills (e.g., Type I Landfills) or in sanitation piping.
- ▶ Workshops and stakeholder engagement provide key input on preliminary results to collaboratively identify feasible pilot projects based on a series of minimum technical, operational and financial criteria.

Project Approach



Stakeholder Engagement



PILOT PROJECT SHORT- LIST SCREENING

Scope and Methodology of Short-List Screening



- ▶ Compares a series of operational criteria to presents options for consideration and facilitate discussion
- ▶ Inventory of regional sites screened based on the existing solid waste and wastewater facilities and select “Greenfield” locations
- ▶ Evaluation focuses on a target organics collection area, and does not screen every facility that has potential to develop AD processing capacity
- ▶ Combination of optimization tool and solid waste industry experience used to identify subset of inventory of regional sites to screen to a short list of potential pilot projects
- ▶ Results of short-list screening will be further evaluated and presented at Workshop 4

Inventory Regional Sites to Determine Scenarios

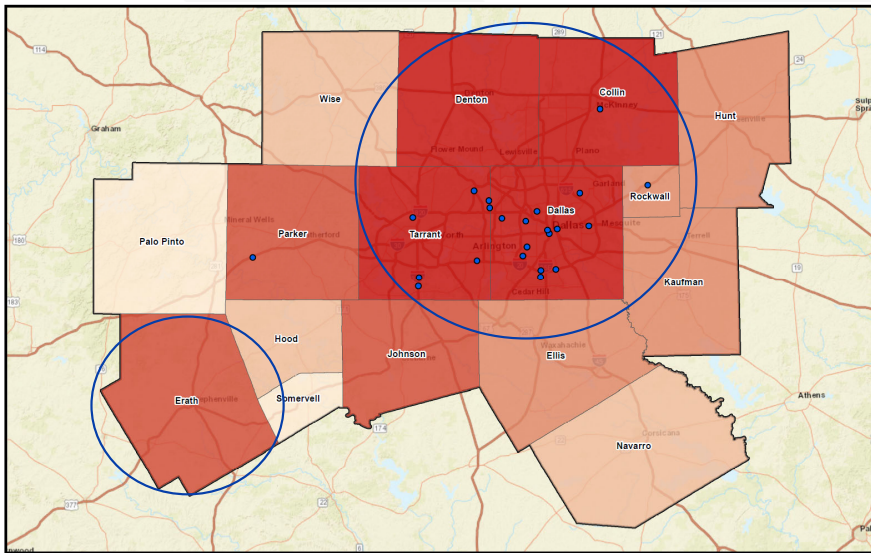


- ▶ Inventory of existing infrastructure sites provides baseline for screening for potential project sites
- ▶ Coordination between Burns & McDonnell and UTA to determine inventory of regional sites
- ▶ Targeted organics collection area determined based on supply and demand analysis
- ▶ 96 total sites considered in the targeted organics collection area including:
 - ▶ Landfills, LFGtE, LFG to RNG
 - ▶ Transfer Station
 - ▶ Mulching & Composting
 - ▶ Liquid Waste Treatment Facilities
 - ▶ WRRF (with and without AD)
 - ▶ Greenfield sites

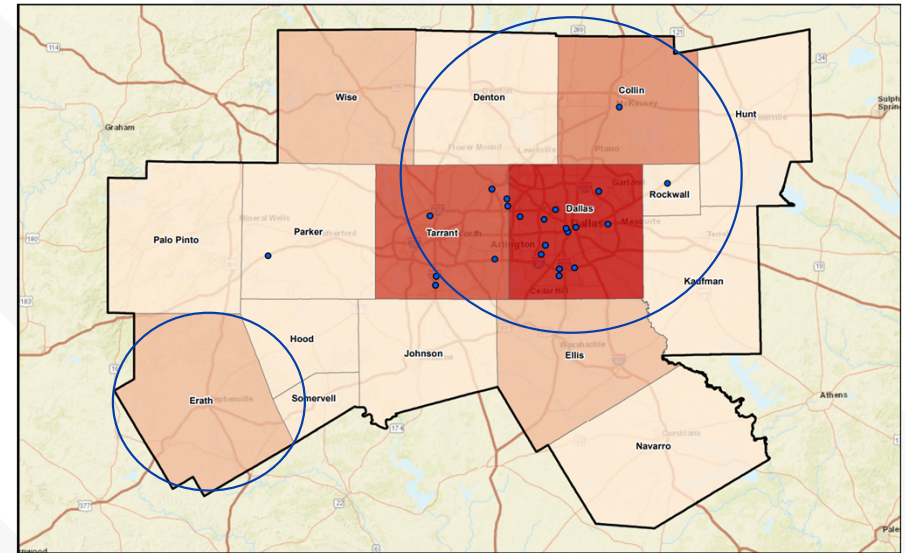
Targeted Organics Collection Areas



POTENTIAL RNG SUPPLY



NGV FUEL DEMAND



- ▶ Location of supply of high priority feedstocks (commercial and residential food waste, FOG) and demand from NGVs indicate Collin, Dallas, Denton, and Tarrant Counties as focus areas for further evaluation
- ▶ Location of supply of medium priority feedstocks (CAFO manure) indicates Earth County as a focus area for further evaluation

Inventory of Regional Material Management Sites

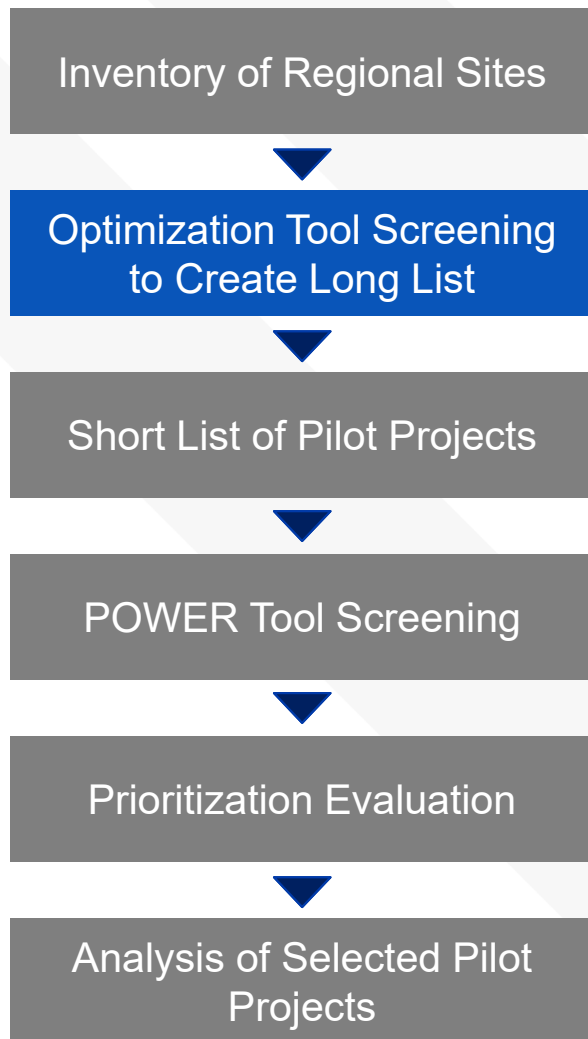


FACILITY TYPE	TOTAL SITES
Landfill	15
Landfill Gas to Energy	5
Landfill Gas to RNG	3
Transfer Station	16
Mulching & Composting	18
Liquid Waste Treatment Facilities	6
WRRF (without AD)	21
WRRF (with AD)	7
Greenfield	5
Total	96

- ▶ Excludes non-pertinent facility types (MRFs, medical waste treatment facilities)
- ▶ One potential greenfield site selected in each County within the targeted organics collection area
- ▶ Potential greenfield site locations identified based on proximity to waste generation projections



Optimization Tool Generates “Long List”



- ▶ Determine optimal facility locations for each scenario
 - ▶ “Levelized” optimization tool to focus on spatial analysis - assumes cost of digester development/processing equal
- ▶ Ran several scenarios that adjusted key inputs as a sensitivity analysis
 - ▶ 20% capture of food waste and FOG
 - ▶ 60% capture of food waste and FOG
- ▶ Results of optimization tool runs compiled into “Long List” of locations
 - ▶ Screened facilities based primarily on 20% capture rate
 - ▶ 60% capture rate provided as sensitivity analysis



Optimization Results by Facility Type

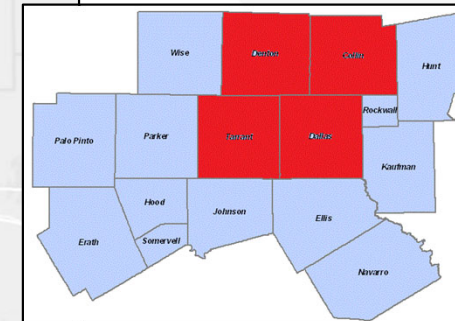
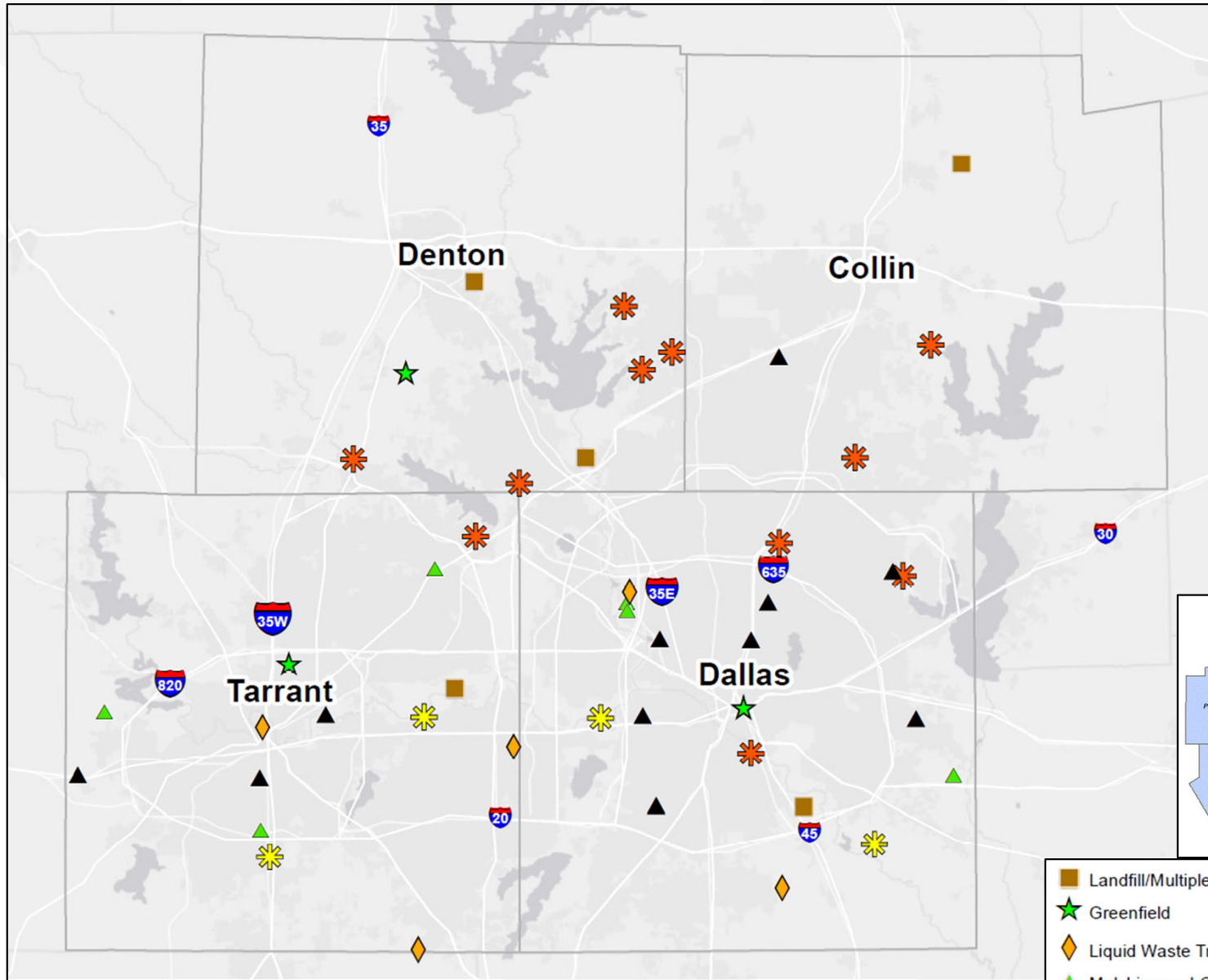
- ▶ Burns & McDonnell and UTA collaboratively developed four optimization analysis scenarios to evaluate the targeted organics collection area
 - ▶ Residential food waste, commercial food waste, FOG at 20% and 60% capture rate
 - ▶ Commercial food waste, FOG at 20% and 60% capture rate
 - ▶ Three additional facilities identified from 60% capture rate sensitivity analysis

FACILITY TYPE	REGIONAL INVENTORY	SCREENED LOCATIONS ¹
Landfill/multiple facilities	23	6
Transfer Station	16	11
Mulching & Composting	18	6
Liquid Waste Treatment Facilities	6	5
WWTP (without AD)	21	12
WWTP (with AD)	7	4
Greenfield sites ²	5	4
Total	96	48

Notes:

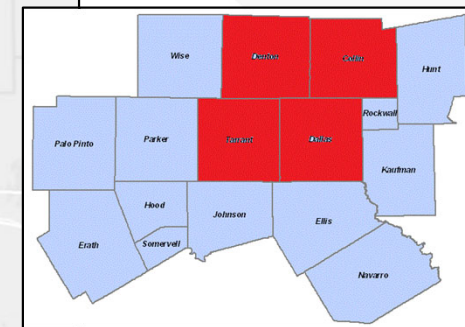
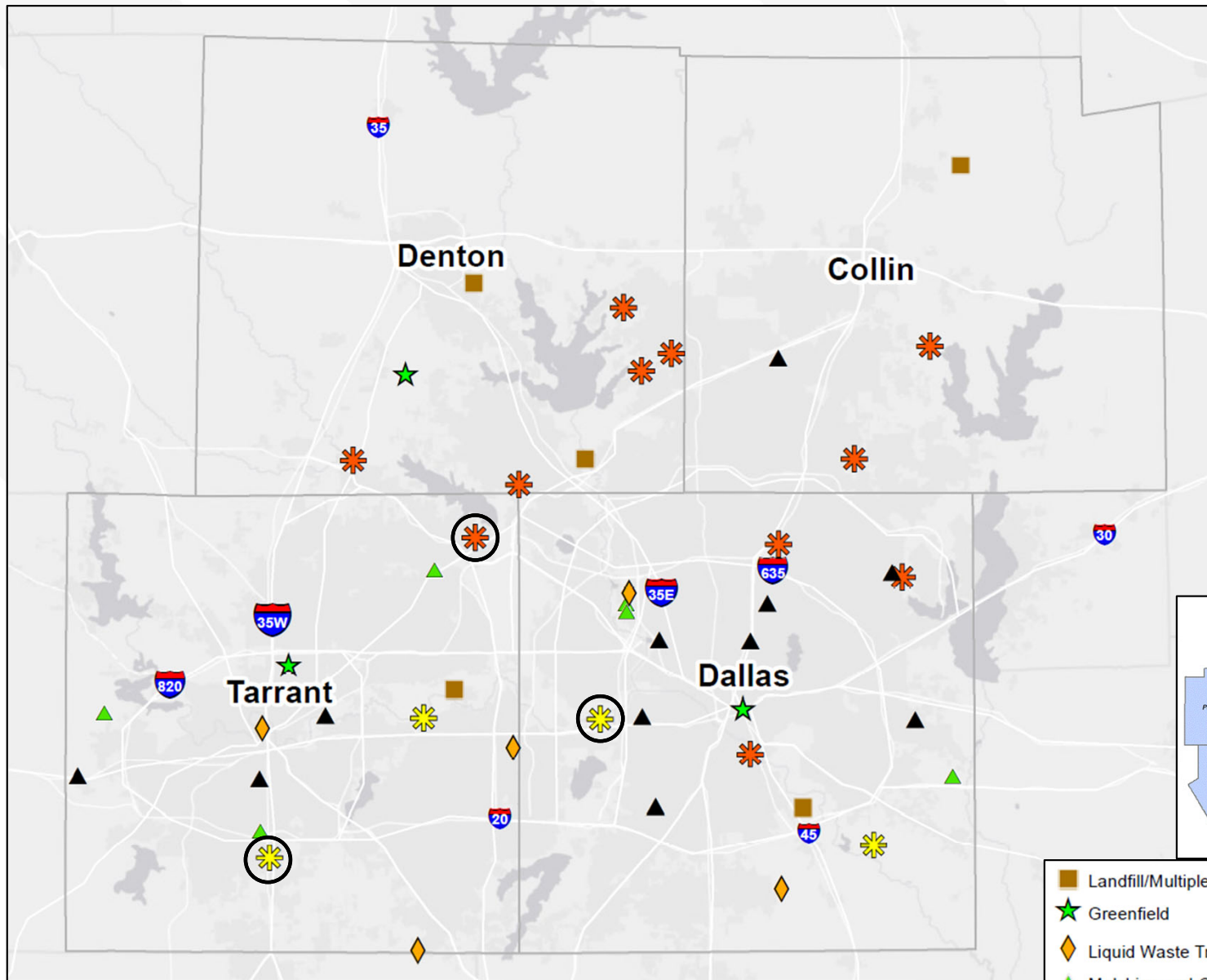
1. Screened locations by facility type re-categorizes some facilities into the appropriate category compared to the regional inventory if multiple facility types are co-located (e.g., Pecan Creek WWTP co-located with Denton Landfill is reflected as part of landfill/multiple facility rather than WWTP (with AD)).
2. Tarrant, Dallas, Collin and Denton County greenfield sites selected based on locations with high feedstock. Erath County greenfield site at the location of closed Huckaby Ridge project site.

Screened Sites by Facility Type - Targeted Organics Generation Area



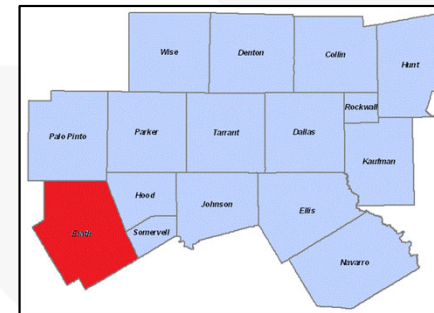
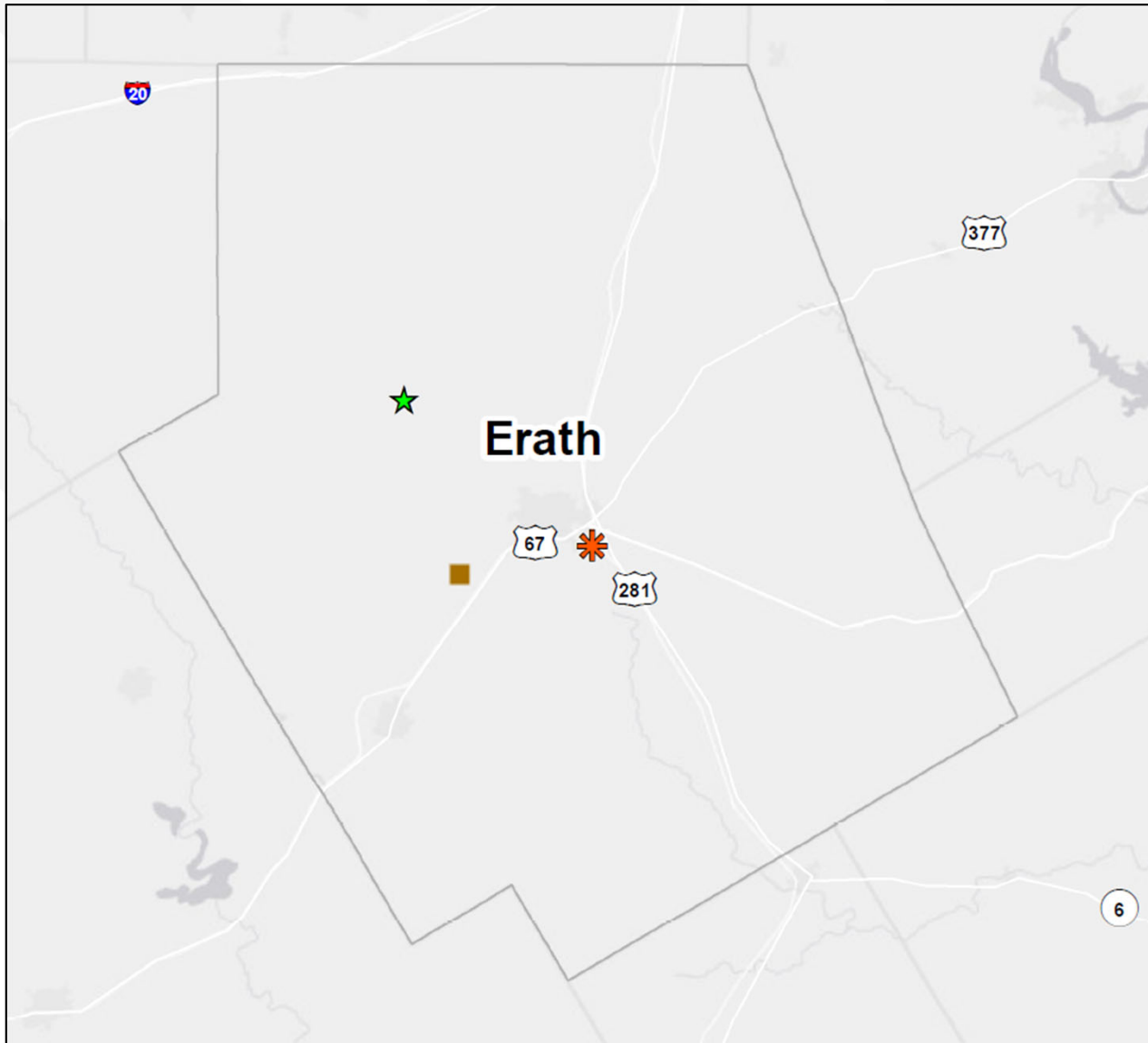
- | | |
|-----------------------------------|------------------|
| Landfill/Multiple Facilities | Transfer Station |
| Greenfield | AD |
| Liquid Waste Treatment Facilities | WWTP |
| Mulching and Composting | Counties |

Screened Sites by Facility Type - Targeted Organics Generation Area (continued)



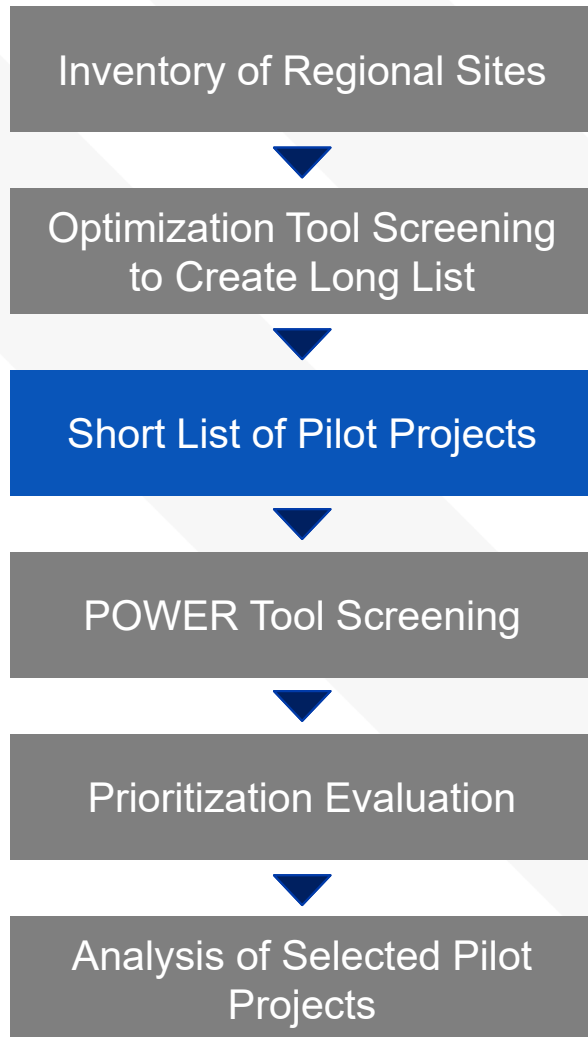
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|-----------------------------------|------------------|
| Landfill/Multiple Facilities | Transfer Station |
| Greenfield | AD |
| Liquid Waste Treatment Facilities | WWTP |
| Mulching and Composting | Counties |

Screened Sites by Facility Type - Targeted Organics Generation Area (continued)



- | | |
|-----------------------------------|------------------|
| Landfill/Multiple Facilities | Transfer Station |
| Greenfield | AD |
| Liquid Waste Treatment Facilities | WWTP |
| Mulching and Composting | Counties |

Generate “Short List” of Potential Pilot Projects



SCREENING CRITERIA	DEFINITION
Feedstock¹	Annual residential and commercial food waste, FOG, manure tonnage generated within five miles
Major Roadways	Number of major highways within one mile
Natural Gas Pipelines	Linear distance to nearest natural gas pipeline
NGV Fuel Demand	Linear distance to nearest fueling demand (e.g., fleet yard, existing fueling facility)
Sludge/Biosolids Generators	Distance to nearest sludge/biosolids generator (e.g., WRRF)

Notes:

1. Feedstock does not indicate expected tonnage to be processed by facility, only the total generation within five miles. Manure generation only considered for Erath County.

Landfills/Multiple Facilities Results



FACILITY	COUNTY	FEEDSTOCK (TONS)	HIGHWAYS	NG PIPELINE (MI)	NGV FUELING (MI)	SLUDGE GENERATOR (MI)
City of Denton Landfill Complex¹	Denton	8,262	1	0.7	0.0	0.0
DFW Recycling and Disposal Facility	Denton	17,939	2	1.3	5.3	2.3
City of Dallas McCommas Bluff Facility	Dallas	11,130	3	1.3	0.7	4.2
City of Arlington Landfill	Tarrant	19,098	0	1.7	3.3	1.9
City of Stephenville Landfill ²	Erath	2,705,364	1	1.1	N/A	6.0
121 RDF Landfill	Collin	929	1	2.5	6.1	3.0

Notes:

1. City of Denton Landfill Complex includes Denton Landfill and Pecan Creek WWTP.
2. City of Stephenville Landfill feedstock only includes CAFO manure tons.

- ▶ City of Denton Landfill Complex is close to required infrastructure
- ▶ Erath County has significant quantities of CAFO manure, but is the location of a previously failed AD facility

Transfer Station Facilities Results



FACILITY	COUNTY	FEEDSTOCK (TONS)	HIGHWAYS	NG PIPELINE (MI)	NGV FUELING (MI)	SLUDGE GENERATOR (MI)
City of Dallas Bachman Transfer Station	Dallas	45,740	4	5.8	0.6	0.6
City of Garland Transfer Station	Dallas	39,551	1	9.7	0.0	0.6
North Texas Recycling Complex ¹	Tarrant	18,088	2	0.1	3.9	6.2
City of Mesquite Transfer Station	Dallas	10,273	1	4.1	0.1	4.5
City of Dallas Westmoreland Transfer Station	Dallas	16,284	1	1.8	1.5	6.6
City of Dallas Fair Oaks Transfer Station	Dallas	31,777	1	10.2	2.9	3.8
Champion Waste Services	Dallas	34,918	1	2.5	0.4	2.0
Custer Transfer Station	Collin	17,962	1	3.1	7.3	7.1
Southwest Paper Stock	Tarrant	22,234	2	2.7	2.1	10.5
City of University Park Transfer Station	Dallas	45,740	1	8.4	0.3	5.7
Westside Transfer Station	Tarrant	3,045	2	6.6	12.2	4.1

Notes:

1. North Texas Recycling Complex does not operate as a transfer station, only as a MRF operated by Republic and fleet and fueling yard for its collection operation.

Composting & Mulching Facilities Results



FACILITY	COUNTY	FEEDSTOCK (TONS)	HIGH WAYS	NG PIPELINE (MI)	NGV FUELING (MI)	SLUDGE GENERATOR (MI)
City of Mesquite Recycling/Waste¹	Dallas	4,429	1	1.0	3.6	0.0
Soil Building Systems	Dallas	28,255	3	2.8	1.0	3.7
Alpine Materials	Tarrant	11,360	1	4.6	3.1	3.3
Thelin Recycling	Tarrant	16,216	2	3.8	2.8	8.4
The Organic Recycler of Texas	Dallas	30,615	3	3.3	0.5	3.3
Silver Creek Materials	Tarrant	4,195	0	4.7	10.2	2.2

Notes:

1. City of Mesquite Recycling/Waste facility co-located with South Mesquite Regional Wastewater Treatment Plant.

- ▶ City of Mesquite has fewer tons in surrounding area, but synergy with co-located wastewater treatment and AD
- ▶ Other composting facilities have more feedstock but are further from key infrastructure

AD/WRRF Facilities Results



FACILITY	COUNTY	FEEDSTOCK (TONS)	HIGHWAYS	NG PIPELINE (MI)	NGV FUELING (MI)	SLUDGE GENERATOR (MI)
City of Dallas Southside WWTP¹	Dallas	4,811	0	3.0	2.3	0.0
Village Creek Water Reclamation Facility¹	Tarrant	19,615	1	0.0	5.7	0.0
City of Garland Rowlett Creek WWTP	Dallas	14,870	1	8.9	0.6	0.0
City of Dallas Central WWTP	Dallas	32,851	3	0.7	1.2	8.7
Stewart Creek WWTP	Denton	15,637	0	0.0	9.1	0.0
Denton Creek Regional WWTP	Denton	3,746	2	2.0	3.9	0.0
Little Elm WWTP	Denton	10,976	0	2.3	10.2	1.1
Rowlett Creek WWTP	Collin	14,435	0	9.2	5.1	5.7
Town of Flower Mound WWTP	Denton	11,783	0	1.4	2.9	0.0
Floyd Branch Regional WWTP	Dallas	27,928	1	10.6	2.4	0.0
Wilson Creek Regional WWTP	Collin	4,458	0	1.3	3.8	0.0
Stewart Creek West Regional WWTP	Denton	18,559	0	1.3	8.7	0.0
City of Stephenville WWTP ³	Erath	1,067,854	3	2.0	48.4	3.4

Notes:

1. Facility currently has AD capacity installed.
2. Pecan Creek WWTP was considered in the long list as part of the Denton Landfill Complex
3. Feedstock represents CAFO manure only. NGV fueling location distance does not consider NGV demand outside of the targeted organics collection area.

Liquid Treatment Facilities Results



FACILITY	COUNTY	FEEDSTOCK (TONS)	HIGH WAYS	NG PIPELINE (MI)	NGV FUELING (MI)	SLUDGE GENERATOR (MI)
Liquitek Arlington Liquid Waste Processing Facility	Tarrant	14,066	3	0.5	3.3	6.3
Clean Earth Environmental Solutions	Dallas	4,881	1	2.7	1.6	5.9
Dallas Grease Trap Grit Trap Treatment Facility	Dallas	26,164	3	2.2	1.6	4.3
Cold Springs Processing & Disposal	Tarrant	21,260	6	1.5	0.9	10.6
Southwaste Disposal Facility	Tarrant	3,137	1	0.8	10.7	4.4

- ▶ Liquid treatment facilities present interesting opportunity to aggregate FOG materials
- ▶ Other solid waste or wastewater facilities (as compared to industrial facilities) are more likely to pursue co-digestion projects

Potential Greenfield Facilities Results



FACILITY	COUNTY	FEEDSTOCK (TONS)	HIGH WAYS	NG PIPELINE (MI)	NGV FUELING (MI)	SLUDGE GENERATOR (MI)
Dallas County Greenfield Site	Dallas	44,975	6	4.0	0.3	3.8
Collin County Greenfield Site	Collin	8,772	3	0.4	12.0	2.9
Tarrant County Greenfield Site	Tarrant	17,261	2	1.8	5.1	6.5
Erath County Greenfield Site ¹	Erath	1,272,500	0	2.0	45.1	8.1

Notes:

1. Erath County greenfield site at the location of closed Huckaby Ridge project site. Feedstock represents CAFO manure only. NGV fueling location distance does not consider NGV demand outside of the targeted organics collection area.

- ▶ Development of a greenfield facility is typically more expensive, but may be feasible if located advantageously for industrial digester (e.g., brewery)
- ▶ Dallas County greenfield site feedstock comparatively higher because location is in downtown/commercial area of City of Dallas
- ▶ Erath County has significant quantities of CAFO manure, but is the location of a previously failed AD facility



Sensitivity Analysis Results

- ▶ Majority of sites identified in sensitivity analysis supported facilities identified in 20% capture scenario
- ▶ Some identified sites were not further screened based on small footprint or proximity to proposed short-listed candidates (e.g., small WRRFs without AD near Denton Landfill Complex)
- ▶ Three sites were identified that should be considered for further evaluation but would require higher capture rate (e.g., 60%) of feedstock to be considered optimal locations

FACILITY	COUNTY	DESCRIPTION
Central Regional WWTP	Dallas	WRRF with AD operated by the Trinity River Authority and located between Dallas and Fort Worth.
Fort Worth Brewery	Tarrant	Miller-Coors brewery with AD and high-volume beverage production capabilities.
Peach Street WWTP	Tarrant	Small WRRF with no AD located adjacent to the DFW Airport, a high NGV demand site.

DISCUSS AND FINALIZE SHORT-LIST

Short-Listed Locations



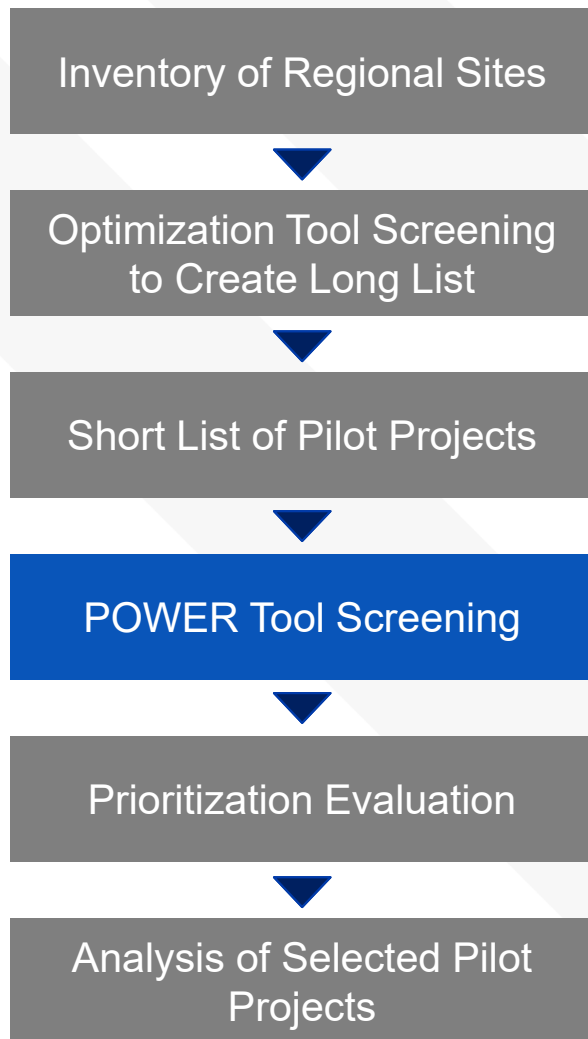
FACILITY	FACILITY TYPE	COUNTY	AD (Y/N)
City of Dallas Southside WWTP ¹	WRRF (with AD)	Dallas	Y
City of Denton Landfill Complex ¹	Multiple Facilities	Denton	Y
Village Creek Water Reclamation Facility	WRRF (with AD)	Tarrant	Y
Central Regional WWTP	WRRF (with AD)	Dallas	Y
Fort Worth Brewery	WRRF (with AD)	Tarrant	Y
Peach Street WWTP	WRRF (without AD)	Tarrant	N
City of Dallas Bachman Transfer Station	Transfer Station	Dallas	N
City of Garland Rowlett Creek WWTP	WRRF (without AD)	Dallas	N
City of Garland Transfer Station	Transfer Station	Dallas	N
City of Mesquite Recycling/Waste	Composting/WRRF	Dallas	N

Notes:

1. Dallas Southside WWTP and Denton Pecan Creek WWTP facilities proposed to be evaluated via the POWER Tool

NEXT STEPS

POWER Tool Provides Initial Evaluation



- ▶ POWER Tool evaluates key project criteria for existing AD facilities
 - ▶ Facility capacity
 - ▶ Biogas output and electricity/fuel generation
 - ▶ GHG emissions
 - ▶ Capital expenses
 - ▶ Operating expenses
 - ▶ Air pollutant emissions
- ▶ POWER Tool results will be incorporated into project assessments

Leverage POWER Tool to Evaluate Existing AD Capacity



Dallas Southside WWTP



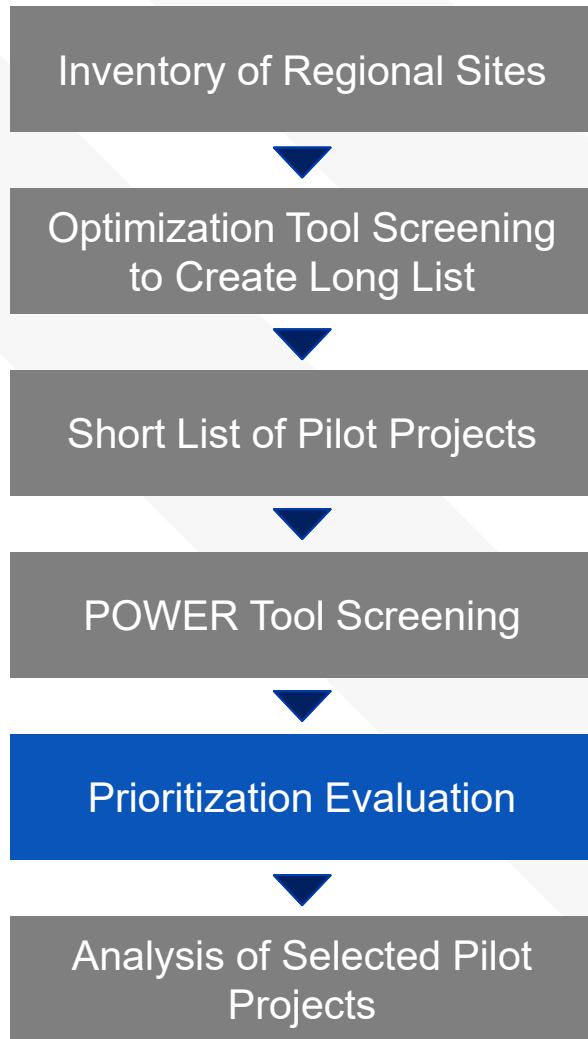
- ▶ Dallas Water Utility (DWU) has agreed to provide information and support further evaluation as part of this project
- ▶ Facility has available capacity and is open to co-digestion of food waste
- ▶ Facility contains large biosolids/sludge disposal area and would consider accepting material from other entities

Denton Landfill Complex



- ▶ Denton wastewater has agreed to provide information and support further evaluation as part of this project
- ▶ Co-located with landfill, composting facility and fleet fueling demand

Prioritization Builds on POWER Tool Results



SCREENING CRITERIA	DEFINITION
Feedstock	Estimated additional influent volume if residential and commercial food waste and FOG tonnage were transported to site.
Infrastructure Requirements	Existing ability to receive collection vehicles and store material at site.
Natural Gas Processing and Transmission	Linear distance to nearest natural gas pipeline interconnections.
NGV Fuel Demand	Linear distance to existing fuel distribution locations/fleets.
Sludge/Biosolids Generators	Estimated biosolids generation within 20 miles.
Byproduct Management	Number of byproduct management facilities (e.g., composting, landfills) within 20 miles.
Environmental Permitting	Evaluation of facility land class, location in relation to floodplains and wetland delineations.
Environmental Justice	Comparative analysis of income, race, and English proficiency at facility location.

Potential Pilot Project Scenarios Matrix



- ▶ Funding/financing considerations
 - ▶ Environmental credits (RFS, LCFS, etc.)
 - ▶ Renewable Energy Credits (RECs)
 - ▶ Federal policy and legislation (Inflation Reduction Act, Bipartisan Infrastructure Bill, etc.)
 - ▶ Infrastructure development grants/loans
 - ▶ Utility investments
 - ▶ Alternative fuel transportation incentives
- ▶ Matrix will indicate project viability with and without available incentives and funding opportunities

Next Steps



- ▶ Move ahead to conduct POWER Tool runs on Pecan Creek and Dallas Southside WRRFs
- ▶ Complete screening evaluation of short-listed pilot projects
- ▶ Develop potential pilot project scenarios matrix indicating viability with and without financial and funding opportunities/incentives
- ▶ Hold workshop #4 – Feasibility Study conclusion in mid-September

THANK YOU!



CREATE AMAZING.