

Solid Waste Infrastructure Assessment in Four Major Markets

Michael Carleton
Arredondo, Zepeda & Brunz LLC

Introduction

Michael Carleton ENV-SP

- Authored several solid waste management plans, including Houston, NCTCOG Regional 20 Years Solid Waste Plan and several other local plans
- *Project Manager for landfill site selections in Corpus, BVSWMA, TASWA, Lubbock, NW Ark*
- Project Manger for Landfill and Transfer station Permits – Laredo, BVSWMA, Lubbock, Garland, Amarillo, Arlington, NTMWD, Corpus Christi
- Waste-to-Energy Experience – Procurement 1700 tpd facility, Acceptance Testing, Feasibility Analysis

Arredondo, Zepeda & Brunz LLC

- Civil, Environmental, Surveying
- *Dallas, Fort Worth, Laredo, San Antonio*
- Specializing in Landfills, Transportation, Water, Transit, Environmental Assessments
- *35 Years serving Texas communities*

Purpose

- Evaluate Solid Waste Infrastructure in Houston, DFW, Austin and San Antonio
- Identify factors that affect available landfill capacity
- Benchmark key solid waste indicators on a regional basis
- Establish a method for examining investment priorities
- Assess the current status of landfill capacity in four major metro regions - current and proposed facilities
- Provide recommendations on how to promote greater long-term landfill capacity

Why is it important?

- Continued population & economic growth = more waste
- Difficulty securing new capacity - 10 to 15 year horizon on new sites
- Minimal state investment in solid waste infrastructure
- Shrinking city budgets
- In spite of major recycling efforts, landfill disposal will continue to be a critical part of waste management



Why These Regions

DFW, Houston, Austin & San Antonio Areas

- 67% of the state's overall population;
- 76% of the state's gross domestic product (GDP); and
- 70% of the total waste disposed statewide.

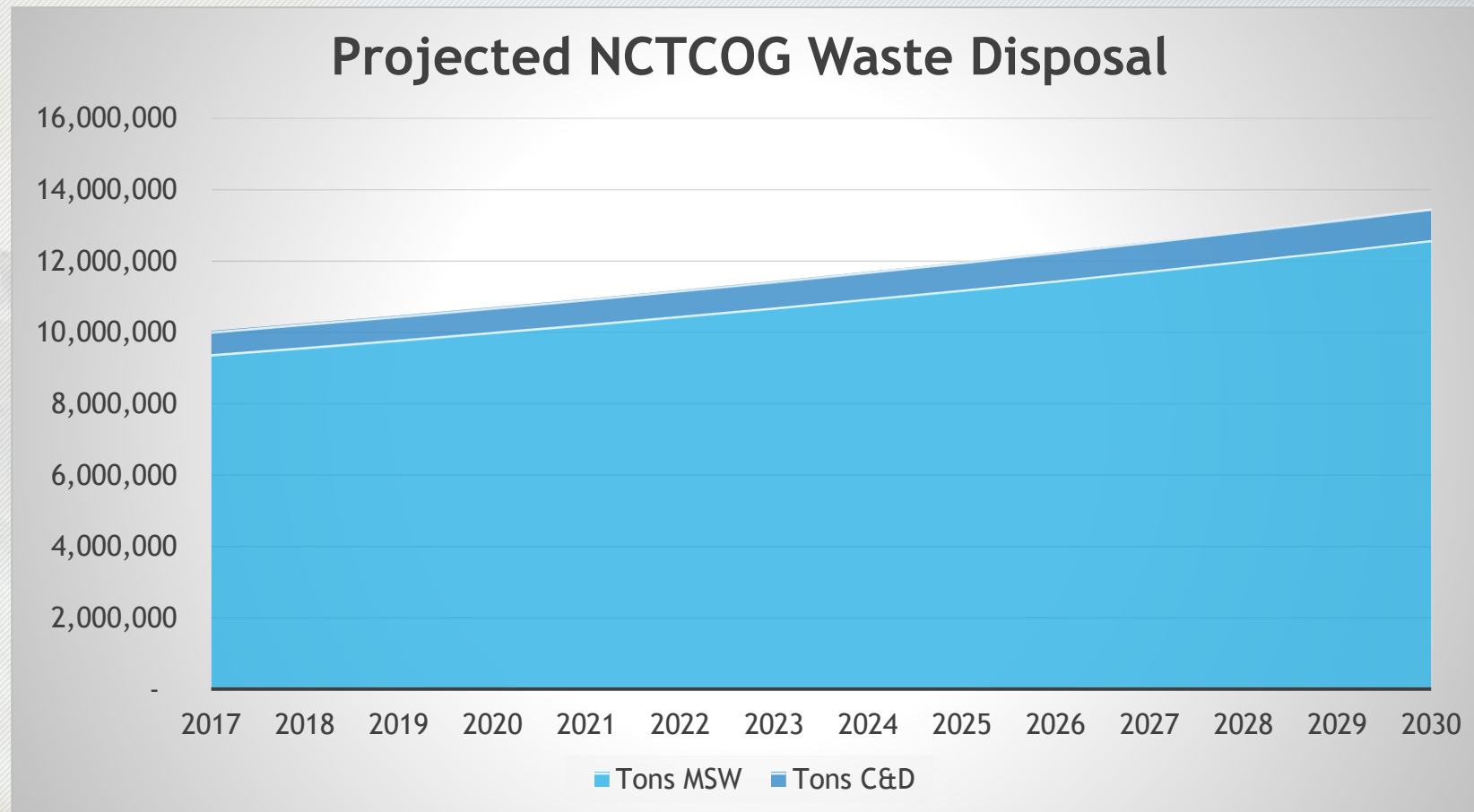
Region	2015 Million Tons Disposed	2016 Million Tons Disposed (Preliminary)
NCTCOG	9.6	10.5
HGAC	8.9	8.6
AACOG	3.0	2.8
CAPCOG	2.2	2.2
Total	23.7	24.1

Continued population & economic growth

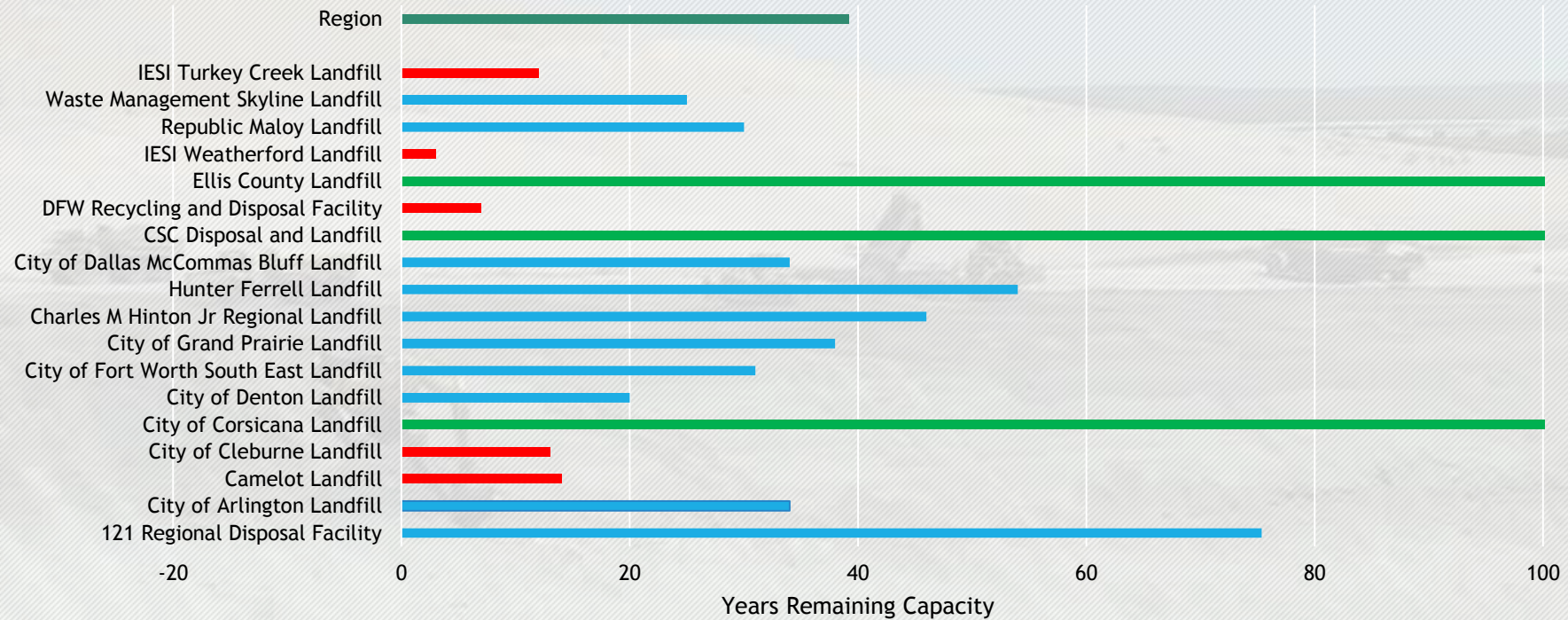
Historically - populations in the four regions have experienced between 2 and 3 percent annual increase between 2005 - 2015. On the high side, TDC projects similar growth through 2030.

Region	2005 Population Million	2015 Population Million	2030 Population Million
HGAC	5.39	6.79	9.46
NCTCOG	5.69	7.23	10.11
AACOG	2.01	2.49	3.32
CAPCOG	1.56	2.11	3.19
Total	14.65	18.62	26.08

Projected Waste Disposal Quantities

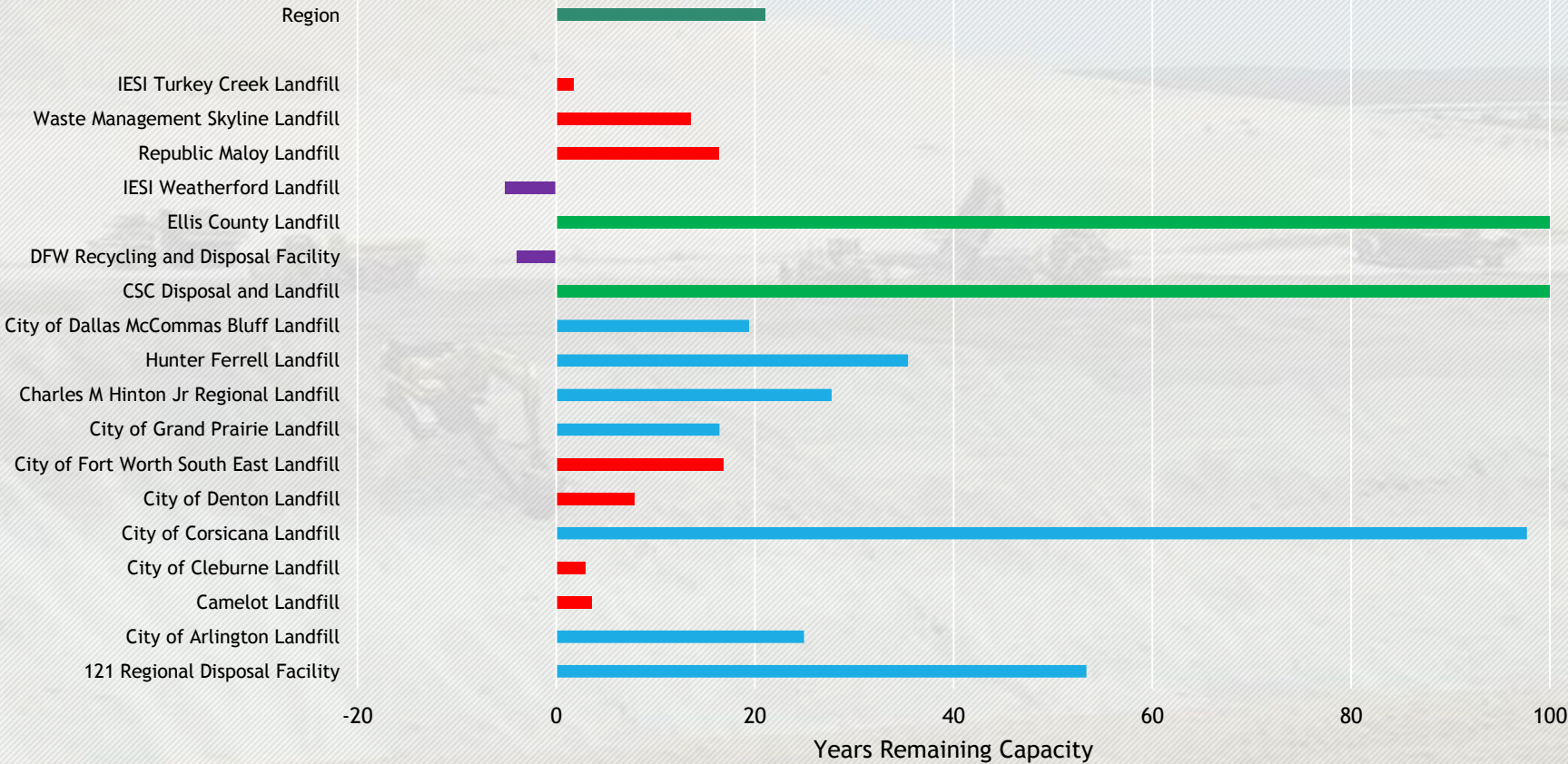


NCTCOG 2015

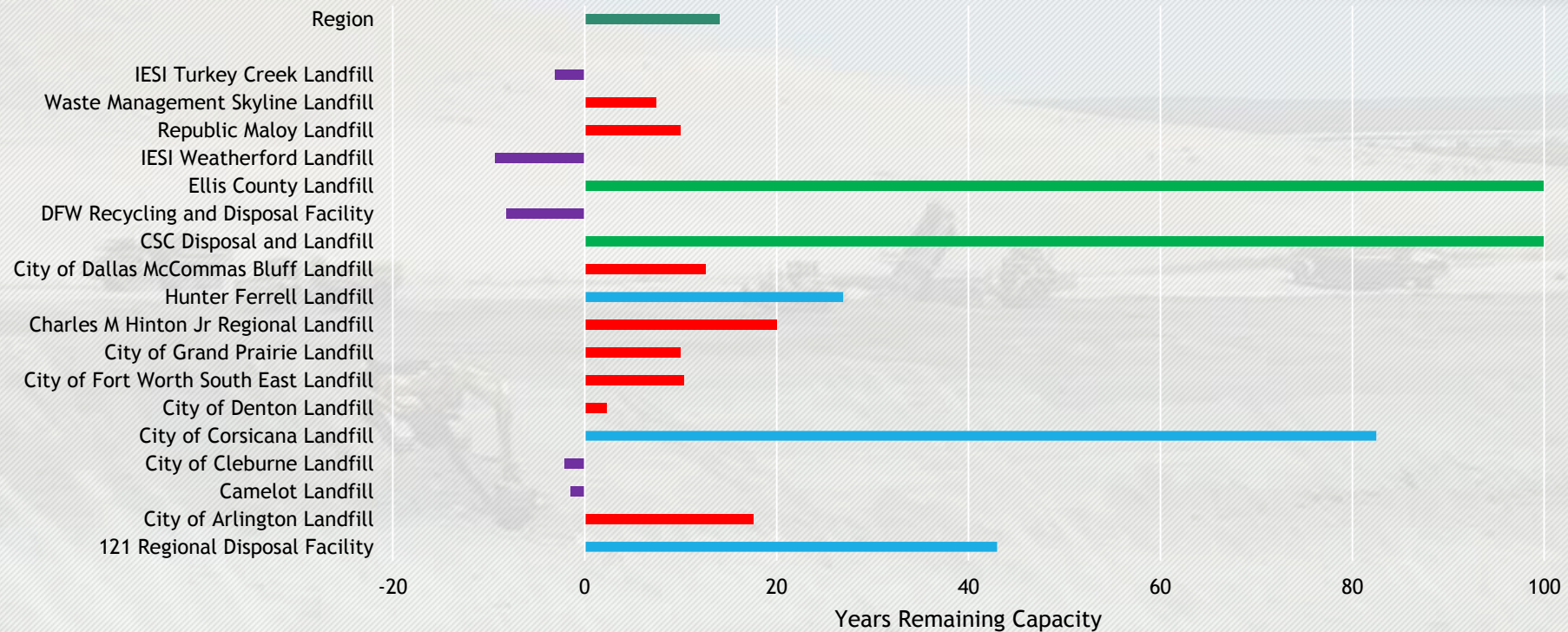


Five with less than 20 years capacity

NCTCOG 2025



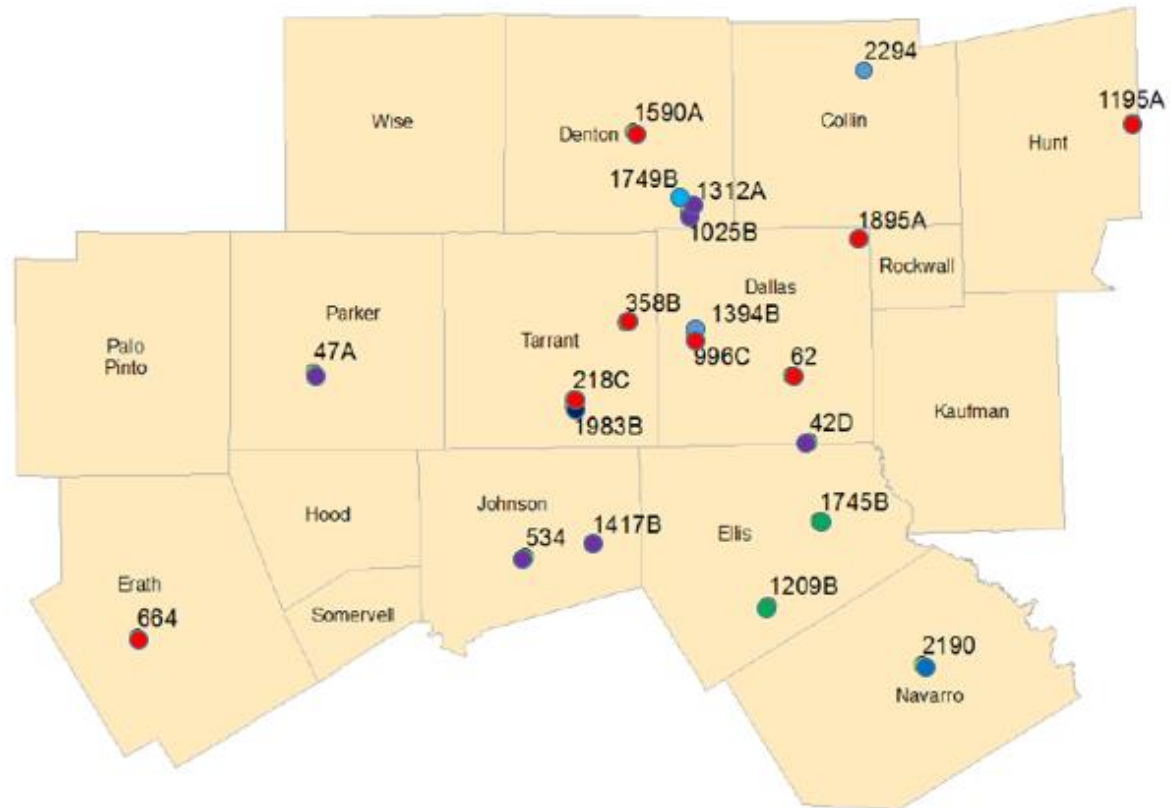
NCTCOG - 2030



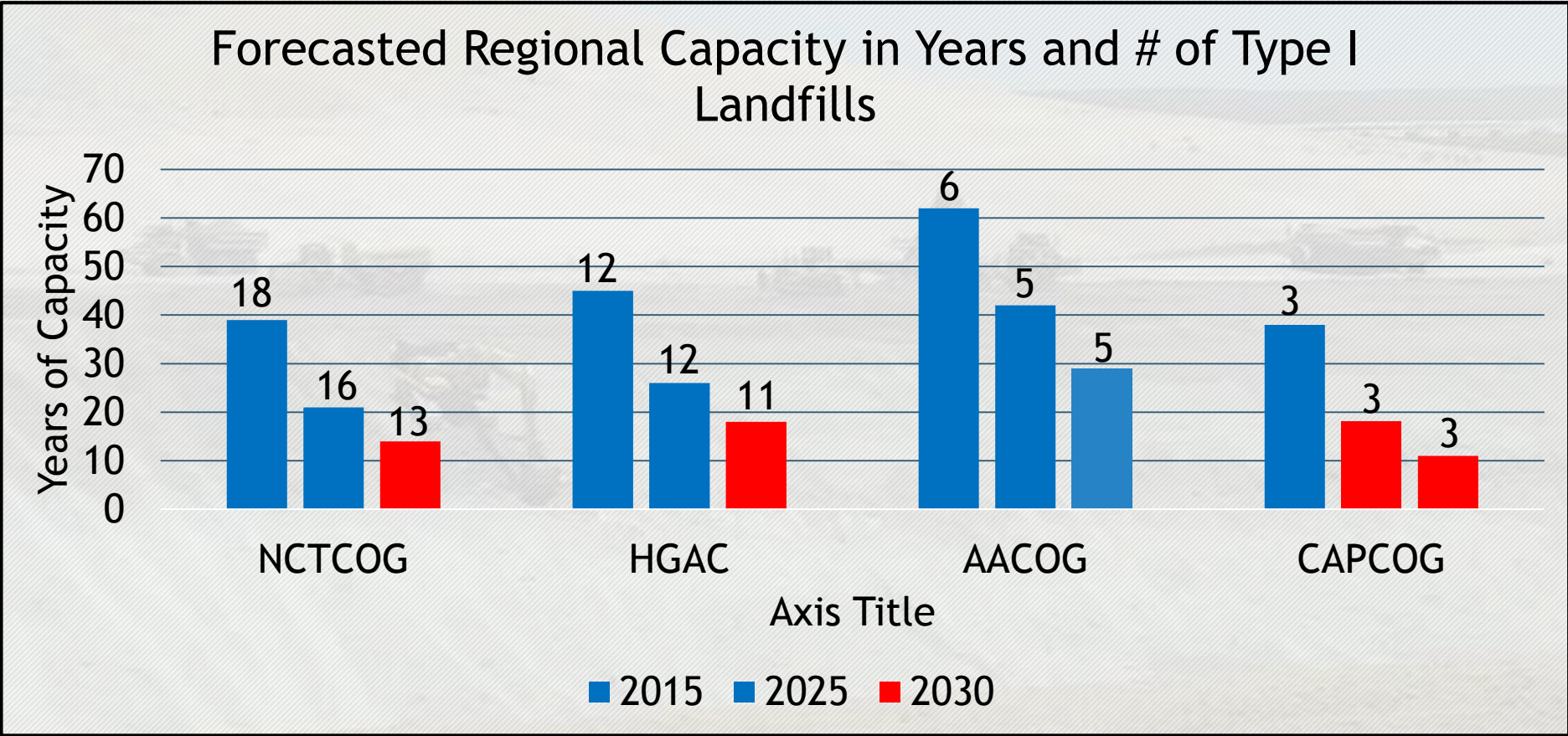
5 landfills reach capacity - impacts remaining landfills
8 landfills with less than 20 years

2030 Capacity Situation

COG 4: North Central Texas Council of Governments

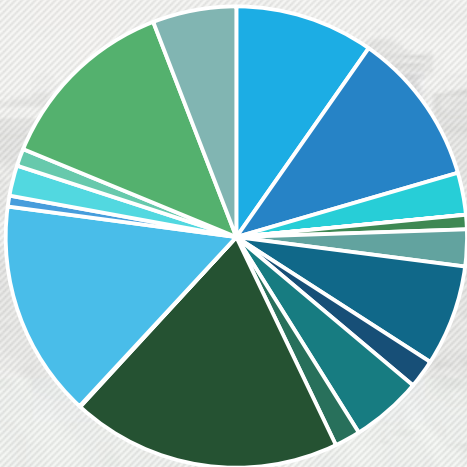


Regional Capacity - 2016 Outlook

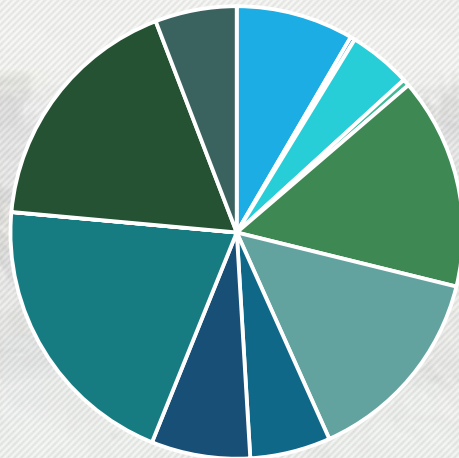


Type I Market Share (disposal)

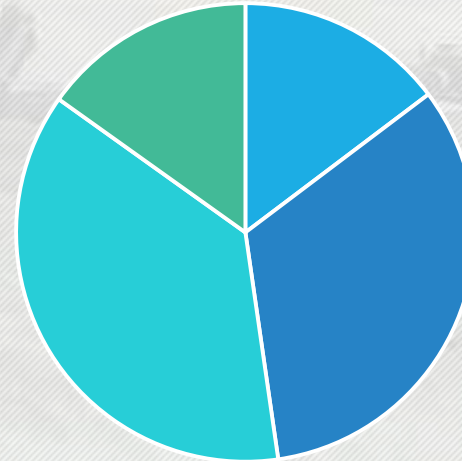
NCTCOG MSW Disposal Market Concentration - 18 Landfills



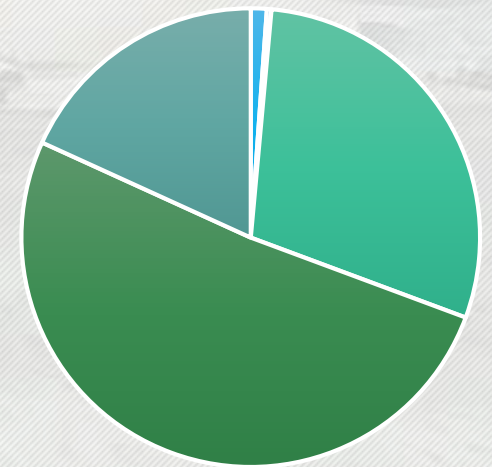
HGAC MSW Disposal Market Concentration - 12 Landfills



CAPCOG MSW Disposal Market Concentration - 4 Landfills



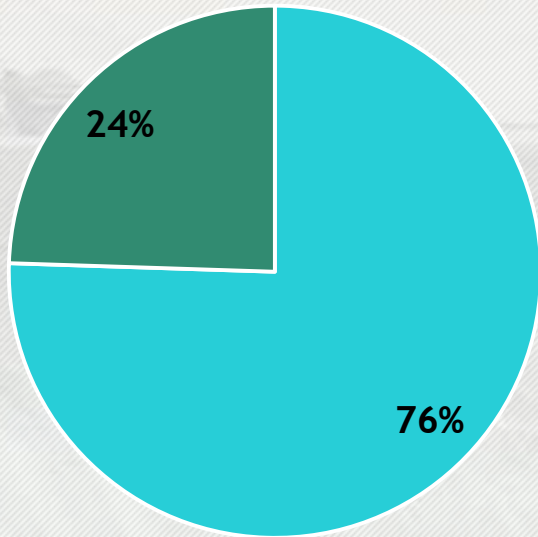
AACOG MSW Disposal Market Concentration - 6 Landfills



If a landfill closes - an average of 500,000 tons has to find a new home - equal to about 180,000 households

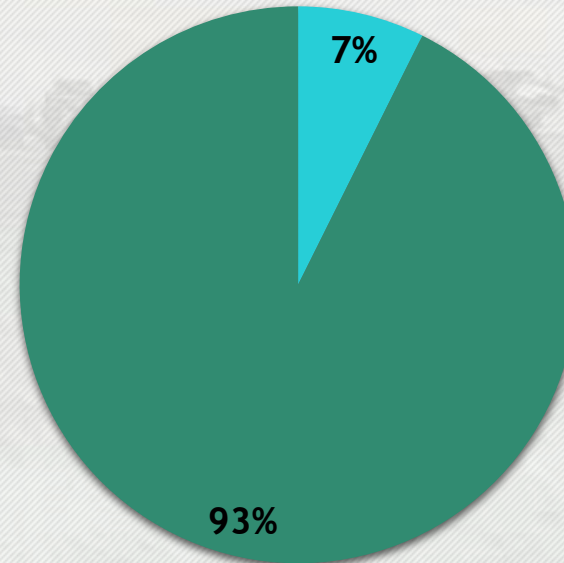
Public - Private Disposal Market Share

2015 NCTCOG
Remaining Capacity - Public /
Private



■ Public ■ Private

2015 HGAC Market Concentration
Remaining Capacity - Public / Private



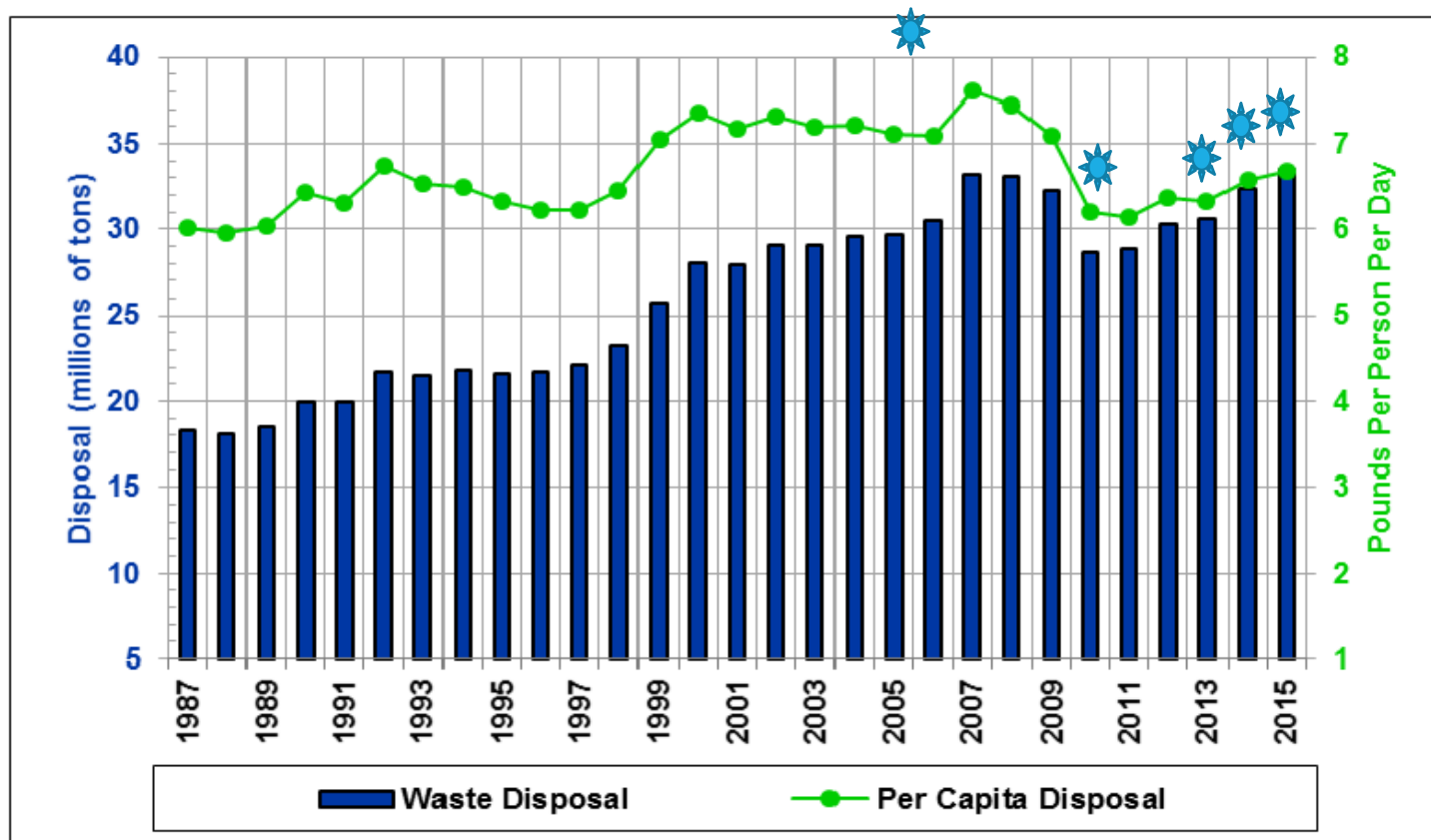
■ Public ■ Private

*three are publicly owned, but privately operated

Local Options for Assuring Disposal Capacity

- Reduce the amounts of waste generated or disposed
 - Reduction / Recycling Programs
 - Composting
 - C&D Processing or Disposal
- Improve landfill operations
- New Capacity
- New Technology

Historic State Disposal Rates - pounds per capita per day



	NCTCOG Per Capita Disposal Rates		
	MSW	C&D	Total
2005	8.07	0.47	8.54
2010	6.26	0.46	6.72
2013	6.46	0.43	6.89
2014	6.70	0.44	7.14
2015	6.82	0.47	7.29
2016	7.38	0.47	7.85

Source: TCEQ Annual MSW Report

2015 Disposal Rate Comparison -



Region	Type I PCD	Type IV PCD	Total PCD	MSW PCD	C&D PCD
NCTCOG	6.82	0.47	7.29	5.81	1.48
HGAC	5.65	1.50	7.15	5.06	2.09
AACOG	5.89	0.71	6.60	5.30	1.30
CAPCOG	5.21	0.58	5.79	4.55	1.24

PCD - pounds per capita per day

HGAC has 21% of total waste going to Type IV Landfills - NCTCOG only has 10% going to Type IV Landfills

If NCTCOG had CAPCOG Disposal Rate - it would generate 11 million tons less waste between 2016 - 2030

Waste imports into the region does impact these disposal rates - waste is flowing across all borders - could be approximately 300,000 tons per year in the NCTCOG region

Construction & Demolition Management

In the four regions - 2016 estimated total C&D Generation = 5.6 million tons - approximately 23% of total waste disposal

Region	Type I C&D Disposal Tons (% of Total C&D Waste) (000)	Type IV C&D Disposal Tons (% of Total C&D Waste) (000)	Total C&D (000)	# / capita / day of C&D disposal	Tons / \$million Construction GDP
H-GAC	500 (19%)	2,095 (81%)	2,595	2.09	101
NCTCOG	1,357 (69%)	617 (31%)	1,957	1.48	100
AACOG	281 (47%)	312 (53%)	593	1.30	110
CAPCOG	256 (53%)	222 (47%)	479	1.24	93
<i>Total</i>	2,383 (43%)	3,243 (57%)	5,627		

Landfill efficiencies have gotten better in most regions - larger facilities = greater efficiency



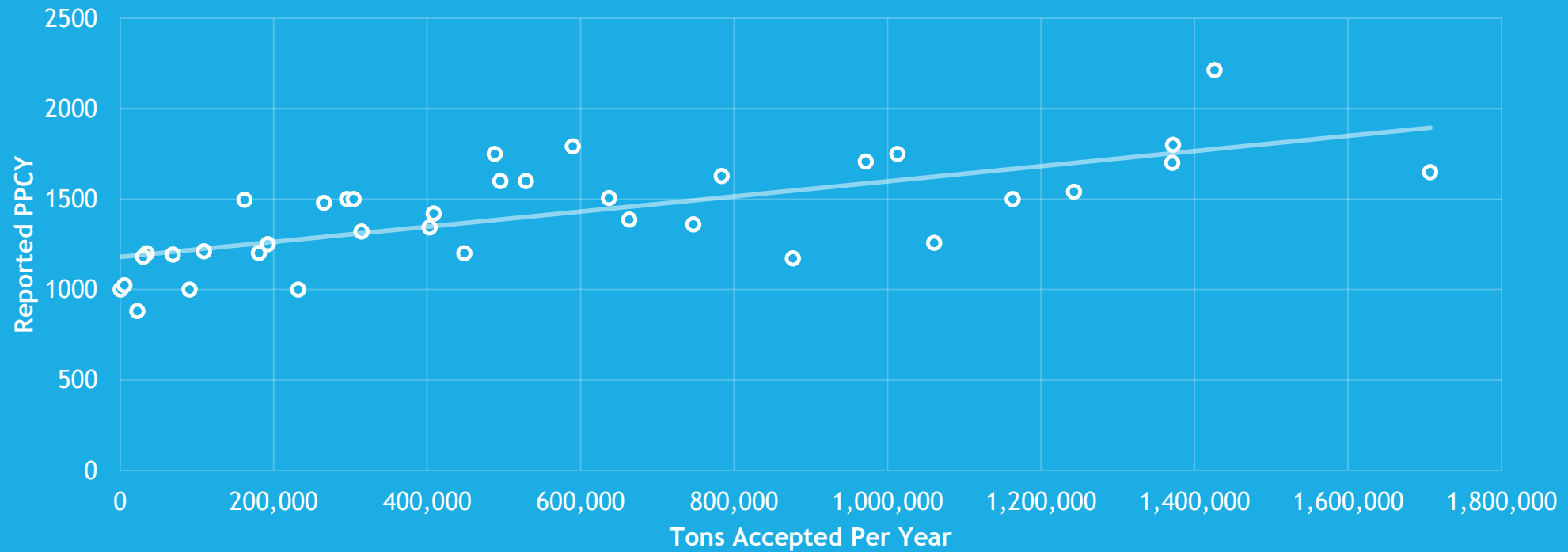
Region	2005 Weighted PPCY	2015 Weighted PPCY	% Improvement 2015/2005
NCTCOG	1294	1504	16%
HGAC	1662	1658	0
AACOG	1609	1737	8%
CAPCOG	1344	1410	5%

PPCY – pounds per cubic yard weighted average

Operational Efficiency Changes 2005 – 2015 Type I Facilities

Landfill Size & Efficiency

TYPE I LANDFILL EFFICIENCY & WASTE QUANTITIES DISPOSED



Landfill Efficiency Quotient

Region	Population	Disposal Rate (pcd)	Disposal Efficiency (ppcy)	Annual Tons	Landfill CY	CY/Capita
HGAC	500,000	5.65	1,658	515,563	621,909	1.24
NCTCOG	500,000	6.82	1,504	622,325	827,560	1.66
AACOG	500,000	5.89	1,737	537,463	618,840	1.24
CAPCOG	500,000	5.21	1,410	475,413	674,344	1.35
Best Case	500,000	5.21	1737	475,413	547,395	1.09
Worst Case	500,000	6.82	1410	622,325	882,730	1.77

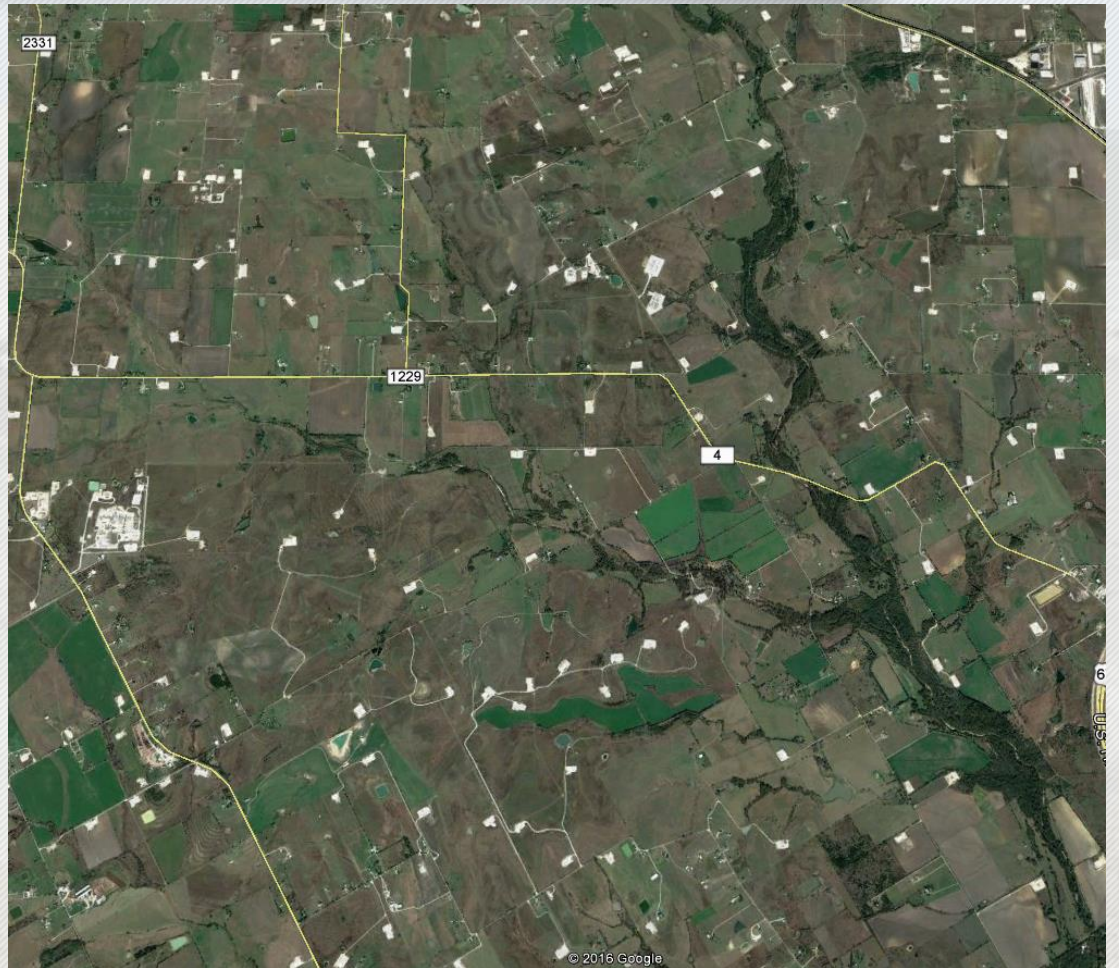
Securing new capacity ... Heavy public opposition

- In 2016 - only 3 Type IV (c&d) and 1 Type I (msw) permit amendments approved in 4 regions
- 10 new permits or permit amendments known to be in process - all 6 Type I's facing heavy public opposition
- The success in legislatively affecting landfill site
- County land use ordinances



In addition to public opposition - land use more difficult

- Harder to find land with minimal development
- Oil & gas development is now significant land use
- Transportation issues & Access
- Timeframe is 10-15 years for new site



Known permit amendments and new facilities add 176 million cy Type I and 50 million cy Type IV

Region	Landfill	Type	Additional Capacity (MM CY)	Notes
NCTCOG	Camelot Landfill	I	37.7	Recent agreement with local government following state legislation requiring local approval in this specific case
NCTCOG	IESI Fort Worth C&D Landfill	IV	18.4	Approved by ED in December 2016
NCTCOG	City of Denton Landfill	I	34.5	In review
H-GAC	Pintail Landfill	I	Unknown	On July 6, 2016 Pintail Landfill initiated a new landfill permitting process
H-GAC	Ralston Road Landfill	IV	1.0	Application Process
H-GAC	Tall Pines Landfill	IV	15.1	Application Process
H-GAC	Fairbanks Landfill	IV	26.2	Approved in 2016
H-GAC	Galveston County Landfill	I	22.4	Approved in 2016
AACOG	Post Oak Landfill	I	87.0	Public hearing completed - awaiting Commission's decision
CAPCOG	130 Environmental Park (Caldwell County)	I	33.0	Administrative review and Technical reviews have been completed. Public hearing is ongoing, with no scheduled agenda date (TCEQ Web Site November 23, 2016)
CAPCOG	IESI Travis Co. Landfill	IV	6.9	Approved by TCEQ in 2016

Source: TCEQ Web Site: Municipal Solid Waste Applications Posted on the Internet, December 2016

Thoughts & Recommendations...

Increasing / High Waste Generation Rates *State*

- Support public information programs to reduce waste
- Mandatory bans on the disposal of certain materials (*Yeah right in Texas*)
- *Providing financial incentives through the State Fund 5000*

Thoughts and Recommendations...

Local Governments

- *Support public information programs to encourage source reduction and recycling, including composting of organics.*
- Focusing *greater attention on the commercial sector's*
- Communities may want to limit the types of materials accepted at landfills. *A challenge in Texas*

Thoughts and Recommendations...

Decreasing Available Disposal Capacity

State

- Continue to *monitor landfill capacity throughout the state.*
- Establish a *permitting protocol that both protects local residents and allows for future new facilities and expansions.*
- Provide funding through subsidized loans or other means to *encourage investments in better landfill equipment to improve operational efficiency.*
- *Evaluate the results of landfill methods such as enhanced leachate recirculation*

Thoughts and Recommendations...

Local Governments

- Undertake a current assessment of solid waste disposal capacity.
- *Evaluate contracts for disposal and determine if modifications are necessary to assure long term availability of capacity.*
- Evaluate contracts and procurement documents for future capacity. Consider whether *landfills are operating efficiently, their long-term capacity* situation and whether they are planning expansions.
- *Encourage the development of more Type IV landfills for C&D waste*
- Cities should begin *examining the potential need for transfer stations as a means of reducing future haul cost increases if landfills reach capacity* and longer haul distances are required.

Questions

Michael Carleton

AZ&B

11355 McCree

Dallas, Texas 75206

214 341-9900

mcarleton@azb-engrs.com