pa rural water Association

2016

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PENN STATER HOTEL + CONFERENCE CENTER STATE COLLEGE, PA

MARCH 29 – APRIL 1

Schedule at http://mobile.prwa.com

Welcome!

Manager's Roundtable

Biosolids

1:30 to 5:00 pm

We're Glad You're Here!

Please, put your cell phones on vibrate during sessions
and, take calls to the hallway

Pennsylvania Rural Water Association
2016 Annual Technical Conference
March 30, 2016
1:30 pm – 5:00 pm

Land Application of Biosolids
Altoona Water Authority
Biosolids Management Program

Presented by:
Todd Musser, Altoona Water Authority
Jim Balliet, Gwin, Dobson & Foreman, Inc.

Presentation Outline

1. Introduction
    a. What are Biosolids?
    b. How are they generated?
    c. Various types of biosolids.
    d. Types of thickening, dewatering, drying equip.
    e. Various disposal options.
    f. Benefits of land application/beneficial use.

Presentation Outline (cont.)

2. Regulatory Update
    a. Relevant Regulations
    b. Types of permits
    c. Requirements for Land Application

Presentation Outline (cont.)

3. Altoona Water Authority - Biosolids Mgmt. Program
    a. Overall system description
    b. Wastewater treatment systems
    c. Biosolids generation
    d. Land application program
    e. Application procedures
    f. Cost benefits
    g. Compliance issues
    f. Future of program

Presentation Outline (cont.)

4. Conclusions
5. Questions/Discussion

What are Biosolids?

- Biosolids are the organic material generated from the treatment of wastewater.
- Nutrient rich material that is beneficial to plant growth and soil conditioning.
- Sometimes used interchangeably with “Sewage Sludge” but “Biosolids” are properly treated and processed sewage sludge.

How are Biosolids Generated?

- Biosolids are created through the treatment of domestic wastewater at wastewater treatment facilities.
- Wastewater goes through physical, chemical and biological processes to remove the solids which are then sanitized to control pathogens and other harmful organisms.
- Requires proper treatment to ensure proper use and disposal.

How are Biosolids Generated?

- The quality of Biosolids is a function of the influent wastewater characteristics and the treatment process.
- Systems that are largely domestic will typically have good biosolids quality.
- WWTFs with no ammonia limits that only have BOD and TSS limits can pass N and P through the process.
- WWTs with ammonia limits typically nitrify to nitrate which increases the nutrient level of the Biosolids.
- WWTFs with phosphorus limits will typically have higher P levels in their Biosolids.

Biosolids Quality

- Systems with a large industrial component could have poor biosolids quality
- Industrial pretreatment programs are very important to limit pollutants that end up in the biosolids
- Some biosolids cannot be land applied because of industrial influence
- Typically metals
- Landfill disposal is usually the only option

Nutrient Value of Biosolids

- Nitrogen in wastewater is removed biologically.
- Phosphorus can be removed both biologically and chemically.

Nitrogen Removal

- Nitrogen (N) enters the plant as ammonia (NH4) and the nitrification process converts NH4 to nitrate (NO3).
- Nitrification requires aerobic conditions.
- Plants that nitrify only typically have good levels of N in their biosolids.

Nitrogen Removal

- Denitrification converts Nitrate (NO3) to nitrogen (N2) gas.
- Denitrification requires anoxic or oxygen deficient conditions.
- Denitrification actually removes nitrogen from the process and results in lower N levels in the biosolids.

Phosphorus Removal

- Phosphorus can be removed biologically or chemically.
- Phosphorus (P) enters the plant and under the right conditions, the microbes will biologically uptake P which can then be removed with the biosolids.
- Soluble P can also be removed chemically using a coagulant to precipitate P in the clarifiers. Again, the P is removed with the biosolids.

Biosolids Quality

- Chesapeake Bay Strategy – Good or Bad?
  - Imposes nutrient limits on discharge
  - Can negatively affect sludge quality
- Requires both nitrification – ammonia to nitrate and denitrification – nitrate to nitrogen gas
  - Therefore, decreases N levels in biosolids
- Biological/Chemical P removal
  - Increase P levels in biosolids
  - Biosolids can have high P and low N

Biosolids Quality

- Chesapeake Bay Strategy
  - Also creates VAR issues
- Long detention times - both nitrification and denitrification processes
- Difficult to achieve 38% VSS reduction
- Rely on SOUR test or 30 day test to meet VAR

- Therefore, the type of treatment process can greatly affect the quality of biosolids and the ultimate disposal option.

Types of Biosolids

- Exceptional Value/Class A
- Class B
- Septage

- Based on:
  - Generation method
  - Pathogen reduction
  - Vector attraction reduction
  - Pollutant levels

Types of Biosolids

- Exceptional Value/Class A
  - Typically generated from composting and dryers
  - Various Class A equipment available
  - Capital and O&M intensive
  - Grants available for equipment
  - Energy (natural gas) is currently favorable
  - Disposal is volatile environment
  - Conservatively assume no revenue

Types of Biosolids

- Class B Biosolids
  - Most common type
  - Majority of the WWTFs produce Class B
  - Standard aerobic or anaerobic digestion processes
  - Liquid and dry (dewatered cake) form
  - Can’t always assume land application

Types of Biosolids Equipment

- Thickening
  - Gravity belt thickener
  - Gravity thickener
  - Thickening centrifuge
  - Decanters
- Dewatering
  - Belt filter press
  - Rotary press
  - Volute press
  - Centrifuge
  - Dryers
  - Others (plate/frame press, baggers, filter bags, liners, etc.)


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Parkson
CAUTION

Disposal Options

- Liquid biosolids can be disposed of by:
  - Hauling solids to other facilities for additional processing
  - Land application by spreading/injection
- Dewatered biosolids can be disposed of by:
  - Land application
  - Landfill
  - Incineration
  - Composting

Land Application

DEP Regulatory Definition:

“The spraying or spreading of sewage sludge onto the land surface for beneficial use: the injection of sewage sludge below the land surface for beneficial use; or the incorporation of sewage sludge into the soil for beneficial use so that the sewage sludge can either condition or fertilize crops for vegetation grown in the soil.”

Land Application of Biosolids

- Highly regulated and closely monitored process
- Public involvement is necessary
- Public education is critical

- 50% of all biosolids in the US are currently land applied
- Used on less than 1% of the country's agricultural land

Land Application of Biosolids

- Agriculture
  - Significantly improves crop yield
  - Reduces fertilizer needs
  - Replenishes organic material
- Land Reclamation
  - Provides nutrients and organic matter to regenerate soils
  - Promotes re-vegetation
- Landscaping
  - High quality biosolids can be used for lawns, gardens, etc.
- Forestry
  - Increases timber growth

Nutrients in Biosolids

- Biosolids contain essential nutrients for plant growth:
  - Nitrogen N
  - Phosphorus P
  - Potassium K
- Application rates are dictated by the level of nutrients (typically N) and the nutrient requirements of the crop.
- Agronomic loading rate for crops usually 2 – 4 DT/acre.
- Application rate must meet the crop needs to avoid nitrate pollution of groundwater.
- Reclamation sites can have much higher application rates (60 DT/acre).

2. Regulatory Update

Biosolids Regulations:

- State – PADEP Chapter 271, subchapter J.
  - Beneficial Use of Sewage Sludge
- Federal – EPA 40 C.F.R. Part 503
  - Standards for the Use and Disposal of Sewage Sludge

DEP General Permits

- PAG-07
  - Exceptional Quality (Class A) biosolids having the highest quality
  - Typically generated from STPs and composting facilities
  - Fewer use restrictions
- PAG-08
  - Biosolids (Class B) generated at STPs
  - Greater use restrictions
- PAG-09
  - Residential septage
  - Requires liming
  - Same land use restrictions

Exceptional Quality Class A Sludge

- Does not have to meet the majority of the requirements
  - 271.913 General Requirements
  - 271.914 Pollutant Limits
  - 271.915 Management Requirements
- Must:
  - 271.932 (c) Meet Class A pathogen requirements
  - 271.933 (b) 1-8 Meet one of the VAR Requirements
  - Be a non-liquid
  - Be non-recognizable as human waste
  - Cannot exceed agronomic rate
  - Provide a label or information sheet

271.913 General Requirements

- Cannot apply biosolids if cumulative pollutant loading rates are met.
- Cannot apply if annual application rate has been meet within a 365 day period.
- Sites must be approved by DEP.
- Must have written landowner consent.
- Must provide landowner with instruction sheet 7 days prior to first application.
- Must meet all notification requirements.

Notification Requirements

- 30 days prior to first application must notify:
  - Adjacent landowners
  - Conservation District
  - PADEP
- 7 days prior to first application must:
  - Provide landowner with instruction sheet

Site Management Criteria

- Conservation Plan and E&SC Plans must be implemented
- Must maintain a soil pH > 6.0 s.u.
- Must meet isolation distances
- Must meet access, harvest and grazing restrictions
- Must meet weather and field conditions
- Must meet storage and staging criteria

Site Suitability

- Cannot apply in exceptional value watersheds.
- Cannot affect threatened or endangered species (PNDI).
- Isolation distances must be met.
- Site slopes.
- Farms must have Conservation or E&SC Plans.
- Farms must have Nutrient Management Plans.

Site Suitability (cont.)

- Isolation distances:
  - 100’ from perennial streams
  - 33’ from intermittent streams
  - 100’ from edge of sinkholes
  - 300’ from occupied dwelling (unless written consent)
  - 300’ from water sources (unless written consent)
  - 100’ from Exceptional Value wetlands
  - 11” from seasonal high groundwater table
  - 3.3’ from regional groundwater table

Site Suitability (cont.)

- Other Restrictions:
  - Agricultural slopes > 25%
  - Land reclamation sites with slopes > 35%
  - Soil pH less that 6.0 s.u.
  - Cannot exceed agronomic loading rate for crops
  - Must have nutrient management plan
  - Land reclamation must be incorporated with 24 hours

271.914 Pollutant Limits

- Cannot apply biosolids if concentration in solids exceeds ceiling limits.
- Cannot apply biosolids if exceeds cumulative pollutant loading rates.

Pollutant Levels

- EPA/DEP regulate the following pollutants in biosolids:
  - Arsenic
  - Cadmium
  - Copper
  - Lead
  - Mercury
  - Molybdenum
  - Nickel
  - Selenium
  - Zinc
  - PCBs

271.915 Management Practices

- Cannot apply to areas that have Federal or State Threatened or endangered species.
- Cannot apply to sites that are flooded, frozen or snow covered.

271.916 Operational Standard

- Biosolids must meet operational standards for:
  - Pathogen Reduction Requirements
  - Vector Attraction Reduction Requirements

271.917 Monitoring Frequency

- The monitoring frequency depends on the amount of biosolids produced annually.
  - < 319 tons - requires 1 sample per year
  - 319 – 1,650 tons - requires quarterly sampling
  - 1,650 – 16,500 tons - requires six samples per year
  - > 16,500 tons - requires monthly sampling

  (Based on dry tons)

271.918 Record Keeping

- Keep records to demonstrate that biosolids meet all requirements:
- 5 year Record Keeping Requirement:
  - Pollutant concentrations
  - Certification statements
  - Verification that PRR were met
  - Verification that VAR were met
- Indefinite Record Keeping Requirement:
  - Locations where biosolids were applied
  - Number of acres applied
  - Date and times of application
  - Cumulative Pollutant levels
  - Amount of biosolids applied
  - Certifications statements

271.919 Reporting Requirements

- Land application of biosolids requires annual reporting to DEP and EPA.
- Example of Annual Reports
- Must Include:
  - Summary of biosolids produced
  - Location of all application sites
  - Amount of biosolids applied
  - Certification Statements
  - Laboratory data on quality

271.932 Pathogen Reduction Requirements

- Reduction of disease causing organisms by:
  - Process controls – time, temp.
  - Process monitoring - pH
  - Indicator organism monitoring – fecal coliform, salmonella levels

271.932 Pathogen Reduction Requirements

- Class A Biosolids must meet one of the PR alternatives (1 – 8) for biosolids that are used on lawns and gardens or sold, given away or distributed in containers.
- Class B Biosolids must meet one the PR alternatives (1 – 10) as well as the site restrictions.

271.932 Pathogen Requirements

- Processes to Significantly Reduce Pathogens (PSRP)
  1. Aerobic digestion
  2. Air drying
  3. Anaerobic digestion
  4. Composting
  5. Lime stabilization

271.932 Pathogen Requirements

- Processes to Further Reduce Pathogens (PFRP)
  1. Composting
  2. Heat drying
  3. Heat treatment
  4. Thermophilic aerobic digestion
  5. Beta Ray Irradiation
  6. Gamma Ray Irradiation
  7. Pasteurization

271.933 Vector Attraction Reduction

- Defined as the characteristic of sewage sludge that attracts rodents, flies, mosquitoes or other organisms capable of transporting infectious agents.
- VAR is the attempt to remove the attracting sludge characteristics.
- Degree of VAR depends on type of biosolids and disposal:
  - Land application Option Nos. 1 – 10
  - Sold, Give Away, Lawn garden Option Nos. 1 - 8
  - Residential Sewage Option Nos. 10 & 11

Vector Attraction Reduction Alternatives

- Minimize the characteristics that attract vectors by:
  - Process controls
  - Process monitoring
  - Site management – incorporating biosolids within a certain time

VAR Options

1. 38% VSS reduction
2. Anaerobic 40 day test – VSS reduction < 17%
3. Aerobic 30 day test – VSS reduction <15%
4. SOUR Test - < or = 1. 5 mg O2/hour/gram of total solids
5. Aerobic 14 days at 68 degrees F. – Temp. > 104 F and average Temp. > 113 F.
6. pH > or = 12 for 2 hours and then 11.5 for additional 22 hours
7. > 75 % solids
8. > 90 % solids
9. Injection with 1 hour for Class B or 8 hours for Class A
10. Incorporation within 6 hours for Class B or 8 hours for A
11. pH raised to 12 for 30 minutes (residential septage)

Residential Septage

- Residential septage from holding tanks and septic tanks can be land applied using DEP's general permits.
- Permits are issued to both generators and land appliers.
- Need to submit and gain approval of NOI for coverage for GP.
- Application sites must meet the GP criteria.
- Notify adjacent landowners, Conservation District and DEP.
- Sites are reviewed and Approved prior to spreading.

BREAK

Presentation Outline

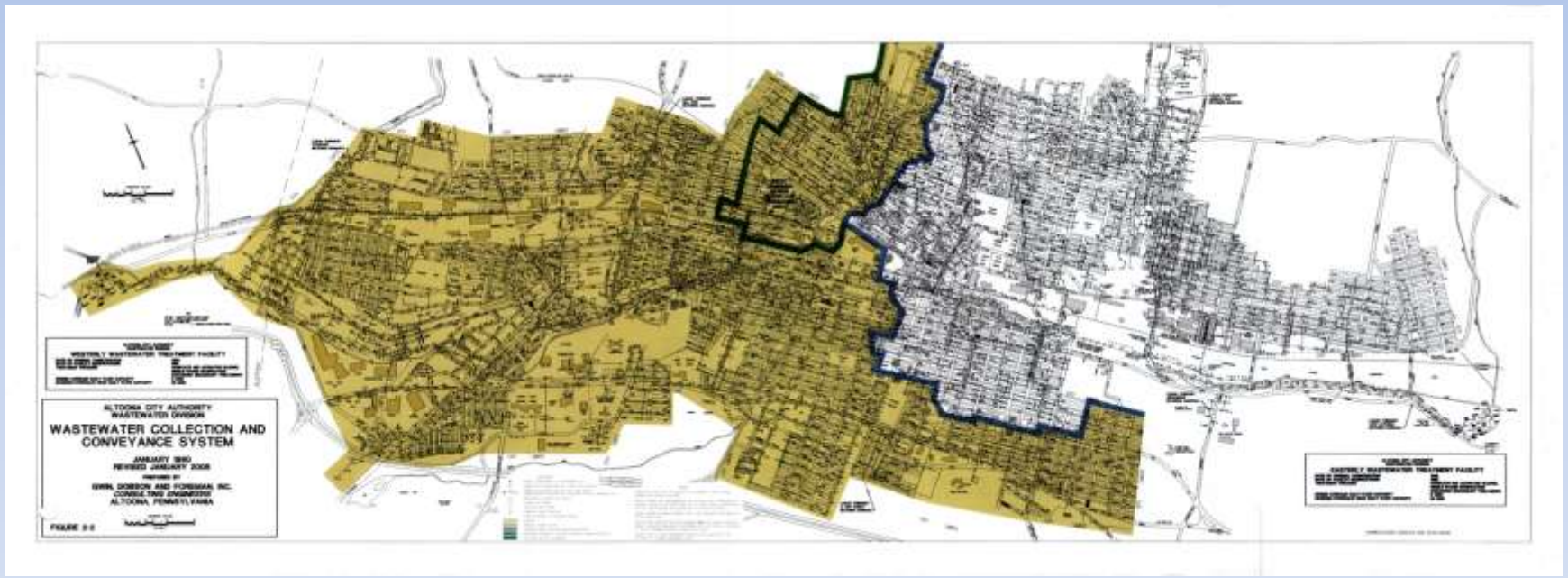
3. Altoona Water Authority - Biosolids Mgmt. Program
    a. Overall system description
    b. Wastewater treatment systems
    c. Solids handling systems
    d. Land application program
    e. Application procedures
    f. Cost benefits
    g. Compliance issues
    f. Future of program

Altoona Water Authority System

- AWA serves 11 Municipalities in Blair County
- 23,000 customers
- 70,000 population
- Two large Wastewater Treatment Facilities
- 230 miles of collection system – partially combined

AWA Treatment History

- 1900s Lagoon system with tile drain
- 1950s WWTF - greenhouse for solids drying
- 1980s Extended air activated sludge
- 2010s Biological Nutrient Removal


ALTOONA CITY AUTHORITY
WASTEWATER DIVISION
WASTEWATER COLLECTION AND
CONVEYANCE SYSTEM
JANUARY 1990
REVISED JANUARY 2008
PREPARED BY
GWIN, DOBSON AND FOREMAN, INC.
CONSULTING ENGINEERS
ALTOONA, PENNSYLVANIA
FIGURE 2-2

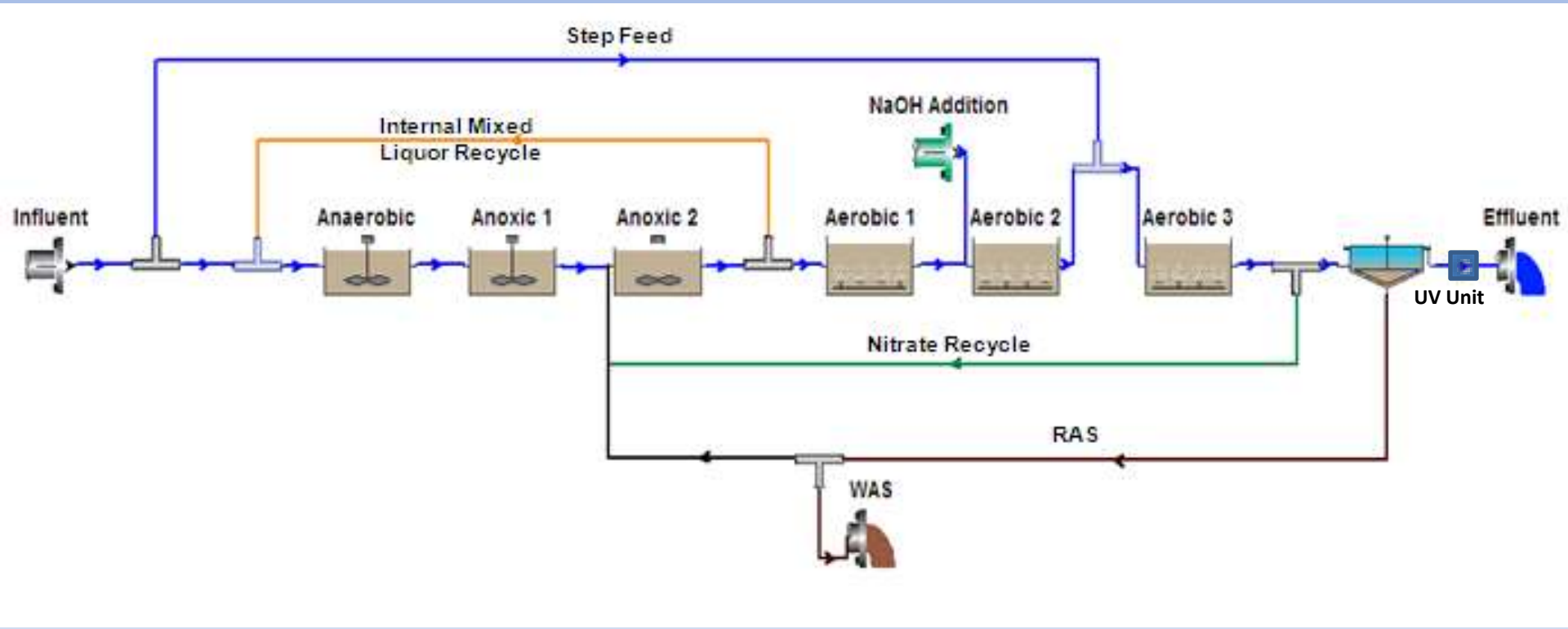
Altoona Water Authority WWTF's

- Two (2) very similar WWTFs
  - Westerly WWTF
    - Average flow 10.8 MGD, Peak flow 60.0 MGD
    - Discharges to the Beaverdam Branch Juniata River
    - Built 1952, upgrade in 1990, BNR in 2012.
  - Easterly WWTF
    - Average flow 9.0 MGD, Peak flow 35.0 MGD
    - Discharges to the Little Juniata River (EV, HQ)
    - Built 1952, upgrade in 1992, BNR in 2013.

Westerly WWTF

Easterly WWTF

Activated Sludge BNR (ASBNR) Process Schematic



Biosolids Generation

- MLSS to Clarifiers
- WAS from Clarifiers to Gravity Belt Thickener (GBT)
- Thickened solids from GBT to aerobic digesters
- Digesters to sludge holding tank
- Sludge holding tank to belt filter press or centrifuge
- Centrifuge to sludge storage building

Biosolids Generation

- MLSS 3000 to 4000 mg/l or 0.3 – 0.4% solids
- Clarifier WAS 7500 to 8500 mg/l or 0.75 -0.85 % solids
- GBT solids 30,000 to 40,000 mg/l or 3 – 4 % solids
- Centrifuge solids 20 to 25% solids

Aerobic Digesters

Two Circular Aerobic digesters with a capacity of 691,000 gallons per side. Each side can be operated independently (parallel) or in series. Sludge can be fed to the thickener or the centrifuge.

Belt Thickener

- Thickens MLSS, WAS or digester sludge to 3% to 4% TSS and then returned to the Digester.

Centrifuge

- Thickens 3% - 4% digester solids to a 20% - 25% cake solid.


centrisys

- AWA Vector Attraction Reduction Methods
  - Primarily use the Specific Oxygen Uptake Rate

    Chapter 271.933 b(4)

  Specific oxygen uptake rate (SOUR)—The mass of oxygen consumed per unit time per unit mass of total solids (dry weight basis) in the sewage sludge.

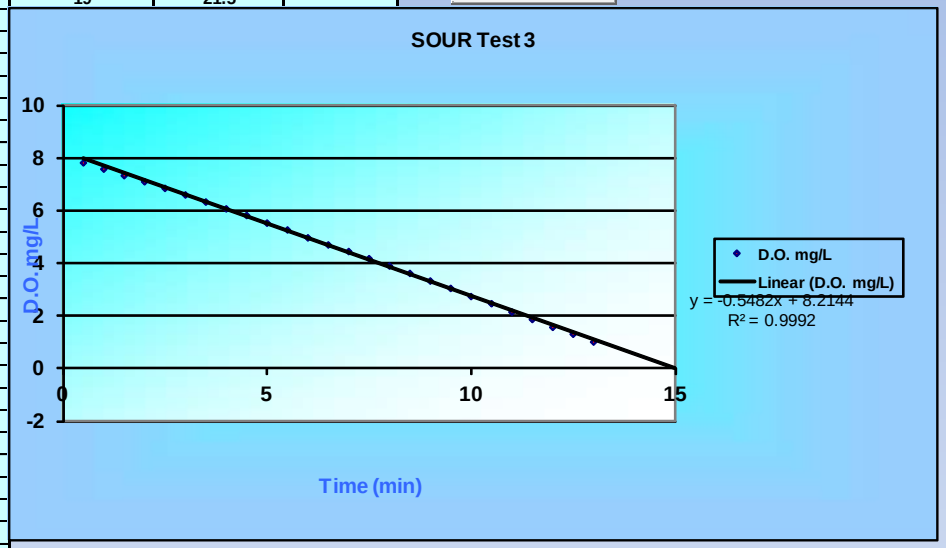
  The SOUR for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 68°F (or 20°C).

SOUR Test Calculations

Batch ID:	WP South Dig.	Comments:
DATE:	4/10/2015	

Time in Minutes	D.O. mg/L	Tot Solids g/L	Temp C	Temp F
0.5	7.81	19	21.5	
1	7.57			
1.5	7.32			
2	7.09			
2.5	6.84			
3	6.59			
3.5	6.32			
4	6.06			
4.5	5.81			
5	5.52			
5.5	5.26			
6	4.96			
6.5	4.69			
7	4.44			
7.5	4.17			
8	3.89			
8.5	3.61			
9	3.32			
9.5	3.04			
10	2.73			
10.5	2.46			
11	2.14			
11.5	1.86			
12	1.56			
12.5	1.3			
13	1			
13.5				
14				
14.5				
15				

Print Test



Slope	-0.548	
Oxygen Uptake Rate	1.7	mg O_2/h/g total solids

Temp Compensation:

Temp C	21.5	
Adjusted Oxygen Uptake Rate	1.6	mg O_2/h/g total solids

SOUR Test
Statistical Analysis
&
Final Results

Final Results	**1.41 mg O_2/hour/g**	**Test PASSED**
Statistical analysis	**Statistical test is adequate**	

RESET

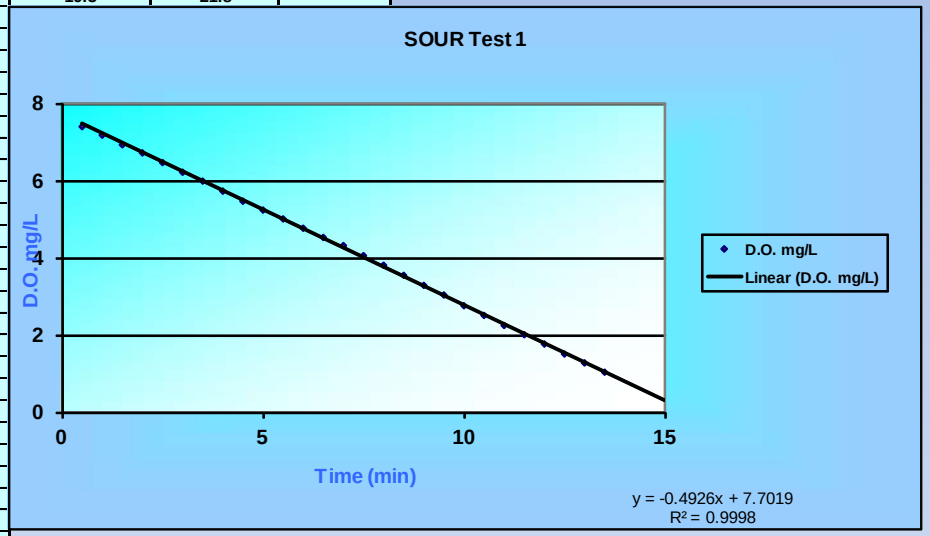
NOTE: A statistical analysis will not be conducted until "Test 1" and "Test 2" are completed. If statistical analysis indicates further tests are required, conduct another SOUR test using "Test 3" Continue conducting SOUR tests until the Statistical analysis box indicates data is adequate. If all 8 tests have been completed, and the statistical analysis box still indicates data is inadequate, use the answer in the Final Results box as the final answer.

SOUR Test Calculations

Batch ID:	WP South Dige	Comments:
DATE:	4/8/2015	

Time in Minutes	D.O. mg/L	Tot Solids g/L	Temp C	Temp F
0.5	7.4	19.3	21.8	
1	7.18			
1.5	6.93			
2	6.72			
2.5	6.47			
3	6.22			
3.5	5.99			
4	5.73			
4.5	5.47			
5	5.24			
5.5	5.01			
6	4.77			
6.5	4.53			
7	4.32			
7.5	4.06			
8	3.81			
8.5	3.55			
9	3.29			
9.5	3.04			
10	2.76			
10.5	2.51			
11	2.25			
11.5	2.01			
12	1.77			
12.5	1.51			
13	1.28			
13.5	1.04			
14				
14.5				
15				

Print Test



Slope -0.493

Oxygen Uptake Rate 1.5 mg O_2/h/g total solids

Temp Compensation:

Temp C 21.8

Adjusted Oxygen Uptake Rate 1.4 mg O_2/h/g total solids

SOUR Test
Statistical Analysis
&
Final Results

Final Results	**1.55 mg O_2/hour/g**	**Test FAILED**
Statistical analysis	**Statistical test is adequate**	

RESET

NOTE: A statistical analysis will not be conducted until "Test 1" and "Test 2" are completed. If statistical analysis indicates further tests are required, conduct another SOUR test using "Test 3" Continue conducting SOUR tests until the Statistical analysis box indicates data is adequate. If all 8 tests have been completed, and the statistical analysis box still indicates data is inadequate, use the answer in the Final Results box as the final answer.

- AWA Vector Attraction Reduction Methods
  - Second Option use the Specific Oxygen Uptake Rate. Chapter 271.933 b(3). Aka “Aquarium Test”
  - When the 38% volatile solids reduction requirement in paragraph (1) cannot be met for an aerobically digested sewage sludge, vector attraction reduction can be demonstrated by digesting a portion of the previously digested sewage sludge that has a percent solids of 2% or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 68°F (or 20°C). When at the end of the 30 days, the volatile solids in the sewage sludge at the beginning of that period is reduced by less than 15%, vector attraction reduction is achieved.


ATTN:
Ken Streifein

West Plant - South Digestor

Start Date & Time 4/15/15, 1030 KAJ

End Date & Time 5/14/15, 0735 KAJ

Date	Time	DO (mg/L)	Temp (°C)	% Total Solids	% Vol. Solids	Initials
4/15/15	1030	6.1	21.5	1.81	69.1	CH/KS
4/16/15	0740	7.8	19.1			KS
4/17/15	0840	7.6	19.0			KS
4/18/15	1950	8.5	19.2			KS
4/19/15	0945	8.2	19.2			BM
4/20/15	0810	7.7	19.0			KS
4/21/15	0720	7.6	19.4			KS
4/22/15	0715	7.8	19.7	1.69	70.7	KS
4/23/15	0730	8.0	19.7			KS
4/24/15	0720	7.8	19.6			KS
4/25/15	1010	7.71	18.6			CH
4/26/15	1030	8.3	18.5			BM
4/27/15	0855	8.2	18.6			KS
4/28/15	0725	8.1	18.7			KS
4/29/15	0730	[illegible]	19	1.78	69.8	KS
4/30/15	0825	[illegible]	[illegible]			CH
5/1/15	0810	[illegible]	[illegible]			KS
5/2/15	0855	7.7	20.0			BM
5/3/15	0855	8.3	19.5			BM
5/4/15	0745	8.6	19.4			KS
5/5/15	0745	8.9	20.2			KS
5/8/15	0740	8.3	18.9			KS
5/7/15	0900	8.4	19.7	1.52	68.4	KS/CH
5/8/15	0925	8.7	19.5			KS
5/9/15	0830	8.4	19.8			BM
5/10/15	1050	8.5	19.9			BM
5/11/15	0750	8.8	20.4			KS
5/12/15	0740	8.2	20.6			KS
5/13/15	0755	8.3	20.3			KS
5/14/15	0735	8.6	19.6	1.50	67.1	KS/CH

PASSED

Sample volume = 12L of sludge from South Digestor diluted to 15L.

West Plant - ~~South~~ Both Digestors

Start Date & Time 2/17/16, 1130 K.S

End Date & Time

Date	Time	DO (mg/L)	Temp (°C)	% Total Solids	% Vol. Solids	Initials
2/17/16	1335	7.1	16.7	1.97	68.1	KS
2/18/16	1100	7.5	18			KJ
2/19/16	0805	7.4	17			CH
2/20/16	1420	7.6	17.5			JW
2/21/16	1435	5.3	18			JW
2/22/16	0830	6.0	17.5			KS
2/23/16	0715	7.9	19.0			KS
2/24/16	0805	7.4	18.5	1.89	69.9	CH
2/25/16	1025	7.6	19	~~1.54~~ KS	~~69.4~~ KS	CH
2/26/16	1050	7.6	18.5			CH
2/27/16	1420	7.1	19			CH
2/28/16	1240	7.3	19.5			AS/JW
2/29/16	0735	7.2	19.1			KS
3/1/16	0825	7.3	20.0			KS
3/2/16	1045	7.4	19	1.81	66.0	CH
3/3/16	1150	[illegible]	19	[illegible] KJ	~~67~~ KJ	CH
3/4/16	1320	[illegible]	18.7			KS
3/5/16	1045	[illegible]	18.5			JW
3/6/16	1420	[illegible]	[illegible]			JW
3/7/16	0745	8.2	18.3			JW
3/8/16	0945	7.8	19.5			CH
3/9/16	0955	7.8	19.5	1.81	67.0	CH
3/10/16	0835	7.8	20			CH
3/11/16	0900	8.0	21.0			KJ
3/12/16	1145	8.51	20.1			CH
3/13/16	1115	8.06	23.8			AS
3/14/16	1625	8.1	21.1			KS
3/15/16	0810	8.4	20.4			KS
3/16/16	0715	8.7	20.7			KS
3/17/16	1025	8.2	21.1			KS
				1.66 Both Digestors KJ	68.8	

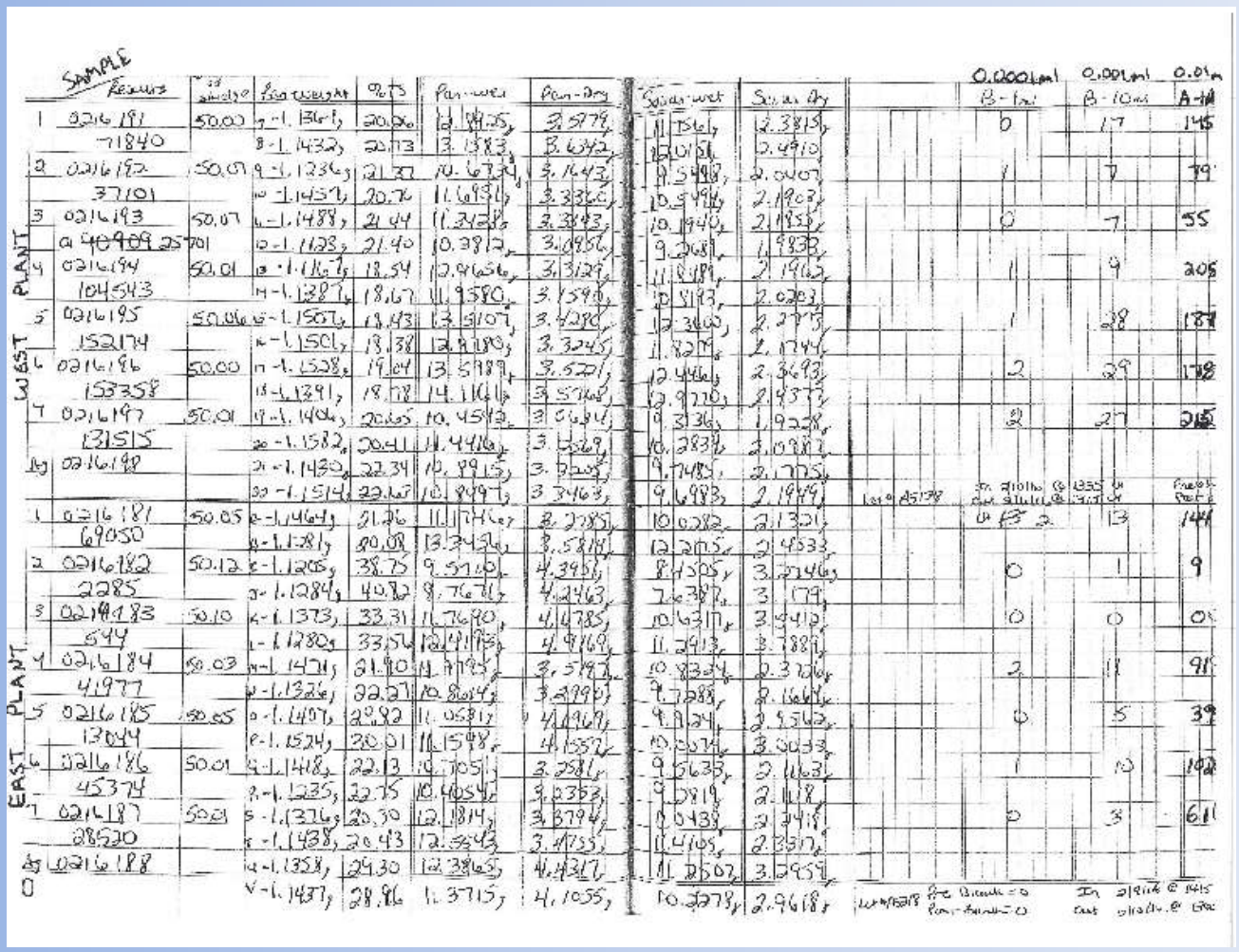
FAILED

Sample volume = 12L of sludge from ~~South Digester~~ diluted to 15L

- AWA Vector Attraction Reduction Methods
  - Third Option use of soil/sludge incorporation. Chapter 271.933 b(10).
  - Sewage sludge applied to the land surface shall be incorporated into the soil within 6 hours after application to the land. When sewage sludge that is incorporated into the soil is Class A with respect to pathogens, the sewage sludge shall be applied within 8 hours after being discharged from the pathogen treatment process.

AWA Pathogen Reduction

- *Pathogenic organisms; disease-causing organisms*— These include, but are not limited to, certain bacteria, protozoa, viruses and viable helminth ova.
- AWA uses the Chapter 271.932 b(2).
- (i) Seven samples of the sewage sludge shall be collected at the time the sewage sludge is used.
- (ii) The geometric mean of the density of fecal coliform in the samples collected in subparagraph (i) shall be less than either 2 million most probable number per gram of total solids (dry weight basis) or 2 million colony forming units per gram of total solids (dry weight basis).



Quarterly Biosolids Analysis

- Composite Samples are pulled and sent to the Penn State Ag Labs for nutrient and Pollutant analysis.
- Sample is also analyzed for % solids to help with land application rates. Percent solids is needed for Wet Tons per Acre application rates.

PENNSTATE

Agricultural Analytical Services Laboratory
College of Agricultural Sciences
The Pennsylvania State University
University Park, PA 16802

Phone: 814-863-0841
Fax: 814-863-1540
Web: www.aasl.psu.edu

PA DEP Lab ID # 14-00588

Analysis Report for Use of Biosolids on Cropland

Todd M. Musser
Altoona Water Authority
144 Westerly Treatment Plant Rd
Duncansville PA 16635

Lab Sample ID:	E17579
Date Received:	2/11/2016
Date Sampled:	2/10/2016
Report Date:	3/25/2016
Sample type:	Composite
County:	Blair
Customer Sample ID:	Weekly 1st Qtr 2016

RESULTS

pH @ 22.5 C	Solids	Volatile	Tot-N	Org-N	NH_4-N	P	K	Mg	Ca	Na	Fe	Al
	%					% (dry weight basis)						
7.1	22.02	71.18	6.67	6.33	0.34	2.75	0.61	0.78	1.63	0.24	1.44	0.53

Mn	As	Cd	Cr	Cu	Pb	Hg	Mo	Ni	Se	Zn	PCB[1]	Reactive CN
						mg/kg (dry weight basis)						
1243.7	5.92	1.30	31.9	315.1	80.4	1.03	7.6	30.9	7.6	483.2	< .12	< 1

NR-Not Requested One dry ton of this material is equivalent to 1084 gallons of wet material or 4.5 tons of wet material

PRIMARY NUTRIENT CONTENT

	% (dry wt basis)	
Total N	6.67	0.75 dry tons of this biosolid will supply 100 lbs of total N
P_2O_5	6.29	1.82 dry tons of this biosolid will supply 100 lbs of P
K_2O	0.73	

ANALYSIS INFORMATION FOR EPA 503 POLLUTANTS

Analyte	EPA SW-846 Method	Analyst	Date	Time
Cd,Cu,Mo,Pb,Ni,Zn	3050B + 6010	Brooks	2/23/2016	10:08:34
As	3050B + 6010	Brooks	2/23/2016	10:08:34
Se	3050B + 6010	Brooks	2/23/2016	10:08:34
Hg	7473	Riebel	2/17/2016	7:07:45 PM
PCB[1]	8082			

[1] Subcontracted to Pittsburgh Laboratories, Inc. (ID #-00062)

RAW LABORATORY BENCH DATA FOR EPA 503 POLLUTANTS

	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
Wet Wt aliquot (g)	1.970	1.970	1.970	0.239	1.970	1.970	1.970	1.970	1.970
Analyte conc. in sample/ digest (mg/L except Hg)	0.059	0.011	3.15	0.0514 ug	0.09	0.27	0.70	0.07	4.20
Method limit (mg/L except Hg)	0.015	0.005	0.015	0.0010 ug	0.015	0.010	0.025	0.025	0.050

Optional Analyses: Results (except soluble salts) on dry weight basis

Nitrate-N (mg/kg)	Total Carbon (%)	CCE Calcium Carbonate Equivalent (%)	Soluble Salts (mmhos/cm)	Other:	Sample Receipt: Ambient Temperature

PASS OR FAIL Sludge Must Be Segregated

AWA Production Westerly WWTF

TABLE 1
2015 BIOSOLIDS GENERATED

MONTH	TOTAL DRY (METRIC TONS)
January	100.56
February	78.57
March	42.48
April	85.72
May	64.8
June	42.92
July	65.58
August	60.09
September	30.3
October	76.07
November	90.79
December	96.41
TOTAL	**834.3**

AWA Production Easterly WWTF

TABLE 1
2015 BIOSOLIDS GENERATED

MONTH	BIOSOLIDS GENERATED (METRIC TONS)
January	33.27
February	46.55
March	41.14
April	109.82
May	49.78
June	22.35
July	32.72
August	20.25
September	27.2
October	32.8
November	33.81
December	44.93
TOTAL	**494.64**

AWA Wet Tons Produced

- Total Two Plants Dry Tons

  1,338 Dry Tons

  Approximately 22% Solids

Over 6,000 Wet Tons of Biosolids that need disposed

The Biosolids Have Met the Requirements…Now What?

- Can we land apply?

  Surface Application

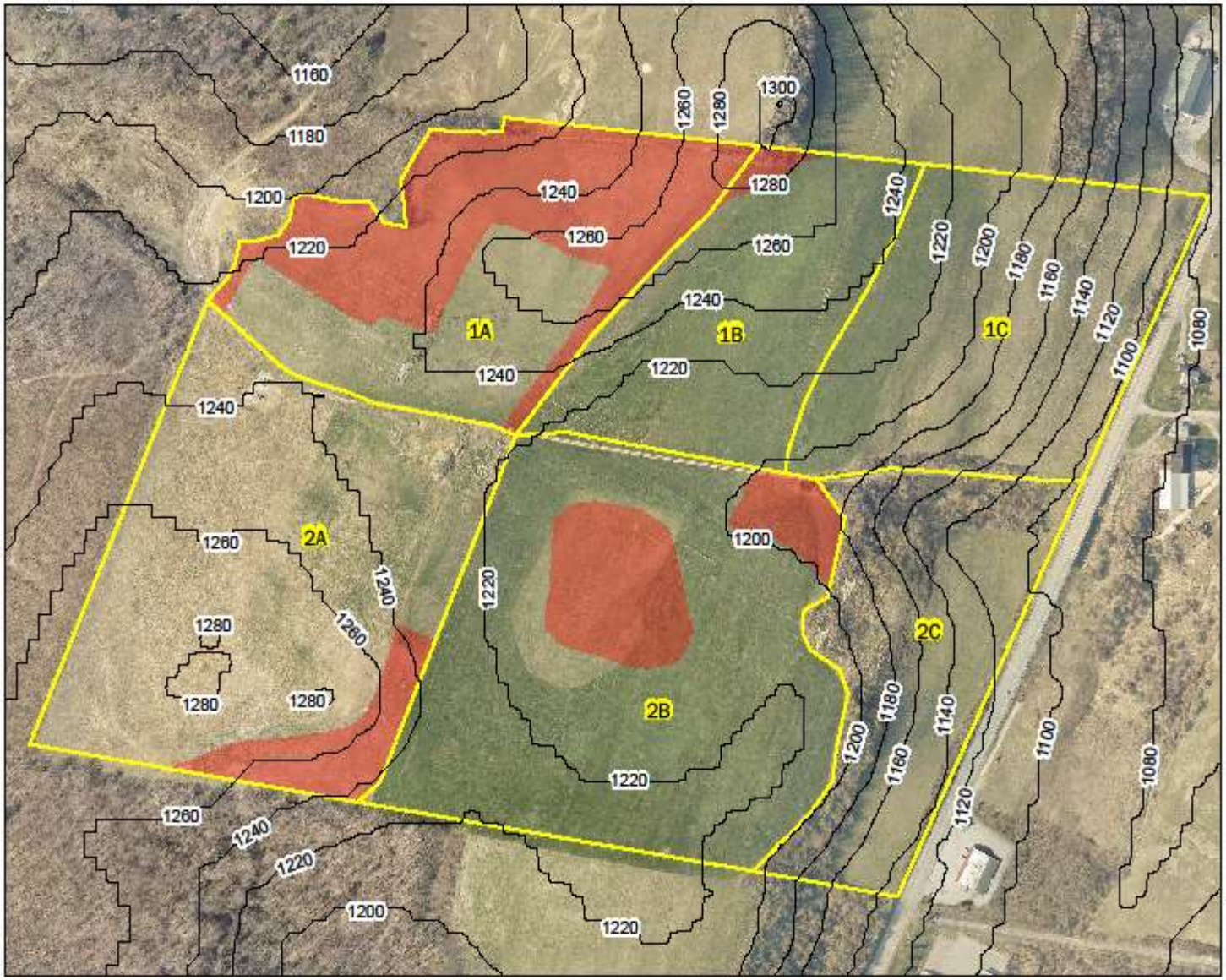
  Incorporation

  Reclamation. Landfill or Mining

  Must we dispose of the Biosolids by permitting the waste and paying disposal costs?

AWA Prefers Ag Land Application

- Beneficial use of nutrients for crop production
- Approximately 3.5 wet tons of the Biosolids supplies 100 lbs of Total N
- Approximately 8 wet tons of the Biosolids supplies 100 lbs of Total P
- Excellent source of nutrients as well as a soil conditioner



ROUGH DRAFT

1 inch = 350 feet


N
0
1
Miles
Robert Smith Farm
Bell Tip Rd
Tipton
E Pleasant Valley Blvd
99
Tuckahoe Rd
Bernard Smith Farm
Skelp Mountain Rd
Antis Township
Grandview Rd
Bellwood
Golf Course Rd
Tyrone Township
Old 6th Ave Rd
Hagerty Farm
Riggles Gap
Bellwood Rd
Homers Gap
Pinecroft
Kettle Rd
Logan Township
Wopsononock Ave
Juniata
AWA Easterly WWTP
Juniata Gap Rd
N 4th Ave
Altoona
E Pleasant Valley Blvd
Catharine Township

AWA Permits

- AWA has 8 permitted farms with 920 spreadable acres
- AWA only has 3 farms actively accepting Biosolids with 167 spreadable acres
- AWA has 2 permitted landfill application sites
- Landfill acreage varies every year based on need

Hegarty Farm

Altoona Water Authority

Hegarty Farm Spreading Plan

Antis Township, Blair County, Pennsylvania

revised 3/18/2016

Field

Restricted

Aerial Photography Spring 2015 (Pictometry)

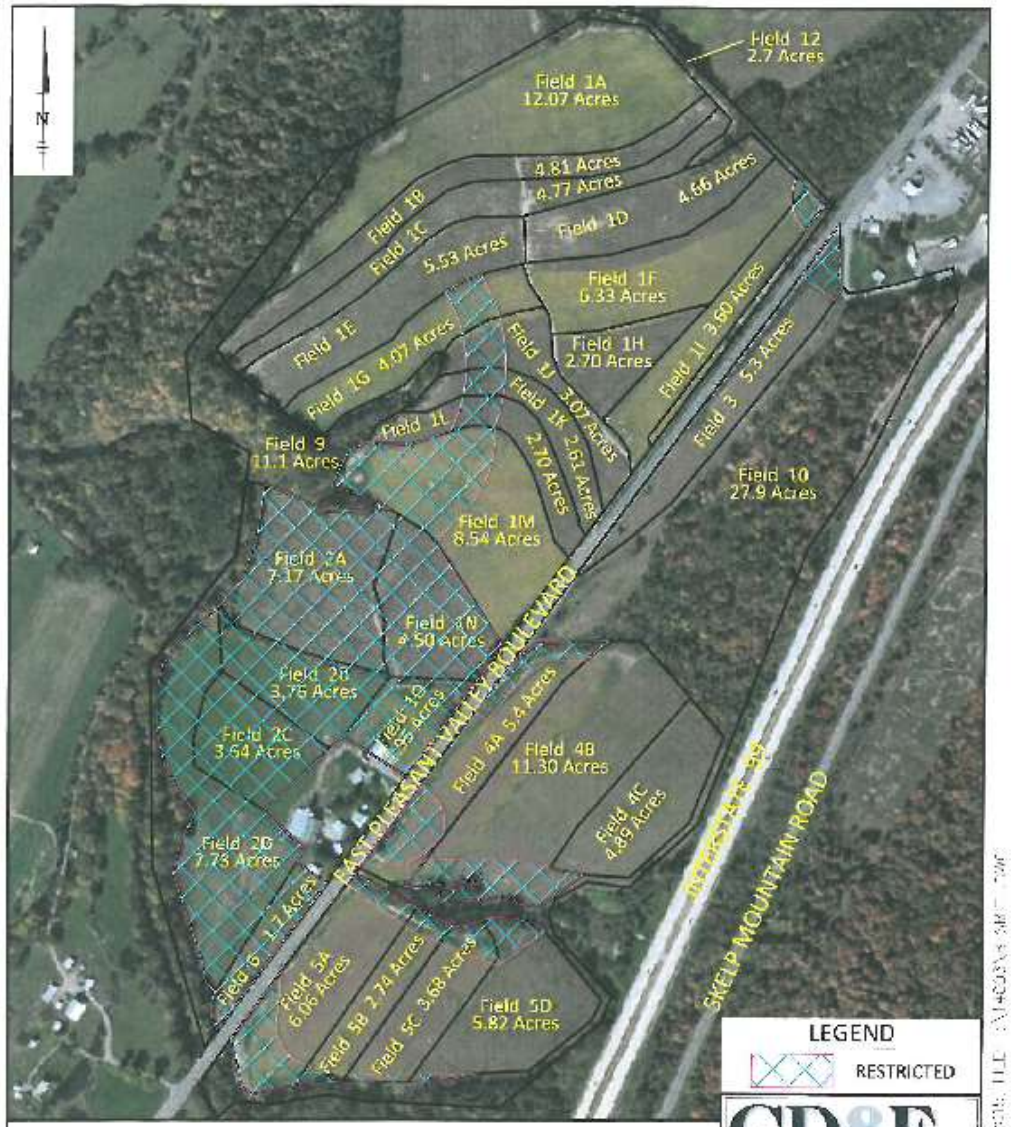
Field	Acres (total)	Acres (unrestricted)	Linear Feet*
1A	17.08	12.03	87,807.28
2A	25.12	21.76	158,677.13
1B	16.40	14.61	106,573.09
2B	27.53	22.92	166,966.87
1C	12.43	0.00	0.00
2C	12.56	0.00	0.00

* Approximate linear feet in unrestricted area at 6-foot intervals

N

0 350

Feet



SPREADING PLAN

BERNARD SMITH FARM
ANTIS TOWNSHIP, BLAIR COUNTY, PENNSYLVANIA

Scale: 1" = 500'


2h
2g
2f
2e
2d
2c
2b
2a
Aerial Photo: Spring 2015, Pictometry
Field
Restricted
0
120
240
Feet

Spreadable Acres Per Field Are Determined

- Isolation Distances and Acreage Loss
  - Distance from wells
  - Property Lines
  - Wetlands
  - Road and ROW
  - Pastures
  - Sinkholes
  - Waterways

Agronomic Loading Rates per Field

- Planned Crop
- Expected Yields
- Nutrient Requirement (Nitrogen Based)
  - Biosolids Supplied
  - Residual Nitrogen (legumes, previous year)
  - Farm Applied (manure, synthetic)
- Sludge Analysis (Varies per WWTF or quarter)
- Acreage (minus non-spreadable)
- CPLR limits

3800-FM-BPNPSM0070 1/2013

pennsylvania DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF POINT AND NON-POINT SOURCE MANAGEMENT

WORKSHEET B1
BIOSOLIDS ANNUAL AGRONOMIC LOADING RATE

Field 2A, Acres: 5.2 — Crop Hay, grass
Growing Season Year 2016 — Yield Goal 3 Ton/Acre
Site Robert Smith Farm

1.	Total crop nitrogen requirement (*From soil analysis, historical data, or Penn State Agronomy Guide*)	**1**	150	lb/acre
2.	Nitrogen provided from other sources either added to or mineralized in the soil			
	a. ***Nitrogen contributions from previous years' activities***			
	1. N from previous legume crop (*Penn State Agronomy Guide*)		0	lb/acre
	2. Estimate of mineralized organic N from previous biosolids applications (*Supplemental Worksheet Part 2.a.2. from previous 2 years applications*) - This does not apply to previous residential septage applications		47.39	lb/acre
	3. Estimate of available residual N from **historical** manure applications (*Supplemental Worksheet Part 2.a.3.*)		0	lb/acre
	Sum of **(a.1. + a.2. + a.3.)**	**2a**	47.39	lb/acre
	b. ***Nitrogen contributions from current year's activities***			
	1. Estimate of available N from **current** manure application (*Supplemental Worksheet Part 2.b.1.*)		0	lb/acre
	2. N from chemical fertilizers		0	lb/acre
	3. N from other sources (ex. food processing waste)		0	lb/acre
	Sum of **(b.1. + b.2. + b.3.)**	**2b**	0	lb/acre
	Total available nitrogen from other sources **(2a + 2b)**	**2**	47.39	lb/acre
3.	Adjusted crop nitrogen requirement **(Subtract 2 from 1)**	**3**	102.61	lb/acre

4. Total available nitrogen from biosolids (based on biosolids analysis)

a. NH_4-N

0.004 %NH_4 x 2,000 lb/ton = 8 lb/ton NH_4-N

8 NH_4 lb/ton x 0.5 K_{vol} (*Vol. Rate Table*) = 4 lb/ton Available NH_4

b. Org-N

0.0343 %Org-N x 2,000 lb/ton = 68.6 lb/ton Org-N

68.6 Org-N lb/ton x 0.3 K_{min} (*Min. Rate Table*) = 20.58 lb/ton Available Org-N

Total plant available nitrogen (PAN) from biosolids **(a + b)** — **4** 24.58 lb/ton Plant Available N

5. Calculate the agronomic loading rate for biosolids application **(Divide 3 by 4)** — **5** 4.17 dry tons/acre

6. Calculate amount of biosolids to be applied — **6** 13.95 ☒ **wet tons/acre or** ☐ **gallons/acre**

4.17 dry tons/acre ÷ 0.2989 (*decimal*) % solids = 13.95 **wet tons/acre**

_____ wet tons/acre x 2,000 lb/ton ÷ 8.5 lbs/gallon = _____ **gallons/acre**

7. P_2O_5 and K_2O fertilizer equivalent in biosolids (based on biosolids analysis)
(Nutrient management information for the farmer)

a. 0.0205 % P in biosolids x 2.29 = 0.0469 % P_2O_5 in biosolids

0.0469 % P_2O_5 x 2,000 lb/ton = 93.8 lb/ton P_2O_5

b. 0.003 % K in biosolids x 1.2 = 0.0036 % K_2O in biosolids

0.0036 % K_2O x 2,000 lb/ton = 7.2 lb/ton K_2O

Agronomic Loading Rates – Smith Farm

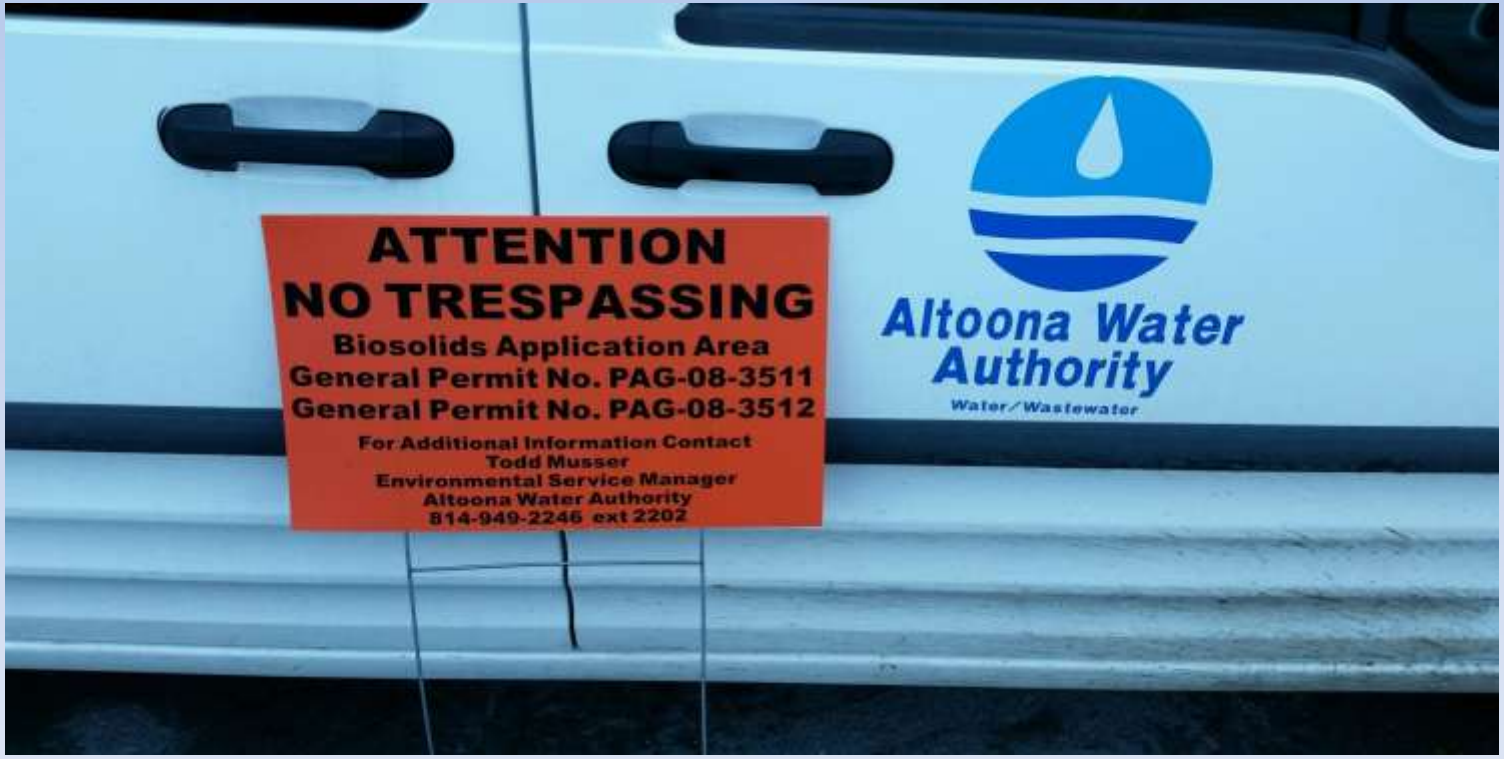
Field		Planned Crop	Desired Crop Yield		Crop N Need	Applied P_2O_5	Applied K_2O	Application Method [1]	Calculated App. Rate Biosolids or Septage	Actual Rate Applied Biosolids	Actual Septage or Biosolids Application Rates		Total Field [2] Septage or Biosolids			Total Acres Spread	Planting Date
ID	Acres		bu/A	T/A	lb/A	lb/A	lb/A		DT/A or Gal/A	DT/A	WT/A	Gal/A	DT	WT	Gal		(e.g., early May)
2-A	5.2	Hay		3	150	603.13	46.3	S	6.21 DT/A	6.43 DT/A	21.54		33.48	112		5.2	Spring 2015
2-B	0.73	Hay		3	150	614.39	47.16	S	6.31 DT/A	6.55 DT/A	21.92		4.78	16		0.73	Spring 2015
2-C	3.09	Hay		3	150	580.62	44.57	S	6.06 DT/A	6.19 DT/A	20.71		19.13	64		3.09	Spring 2015
2-D	2.62	Hay		3	150	342.37	26.28	S	6.07 DT/A	3.65 DT/A	12.21		9.56	32		2.62	Spring 2015
2-E	2.01	Corn	150		150	446.49	34.27	S	4.93 DT/A	4.76 DT/A	15.92		9.56	32		2.01	Spring 2015
2-F	2.08	Corn	150		150	431.48	33.12	S	4.93 DT/A	4.6 DT/A	15.39		9.56	32		2.08	Spring 2015
2-G	1.68	Hay		3	150	667.86	51.26	S	6.58 DT/A	7.12 DT/A	23.81		11.96	40		1.68	Spring 2015
2-H	2.21	Hay		3	150	406.15	31.18	S	6.04 DT/A	4.33 DT/A	14.48		9.56	32		2.21	Spring 2015
Totals	19.62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.0 DT/A	18.35		98.03	360		19.62	N/A

Cumulative Pollutant Loading – Smith Farm

Field		Planned Crop	Desired Crop Yield		Crop N Need	Applied P_2O_5	Applied K_2O	Application Method [1]	Calculated App. Rate Biosolids or Septage	Actual Rate Applied Biosolids	Actual Septage or Biosolids Application Rates		Total Field [2] Septage or Biosolids			Total Acres Spread	Planting Date
ID	Acres		bu/A	T/A	lb/A	lb/A	lb/A		DT/A or Gal/A	DT/A	WT/A	Gal/A	DT	WT	Gal		(e.g., early May)
2-A	5.2	Hay		3	150	603.13	46.3	S	6.21 DT/A	6.43 DT/A	21.54		33.48	112		5.2	Spring 2015
2-B	0.73	Hay		3	150	614.39	47.16	S	6.31 DT/A	6.55 DT/A	21.92		4.78	16		0.73	Spring 2015
2-C	3.09	Hay		3	150	580.62	44.57	S	6.06 DT/A	6.19 DT/A	20.71		19.13	64		3.09	Spring 2015
2-D	2.62	Hay		3	150	342.37	26.28	S	6.07 DT/A	3.65 DT/A	12.21		9.56	32		2.62	Spring 2015
2-E	2.01	Corn	150		150	446.49	34.27	S	4.93 DT/A	4.76 DT/A	15.92		9.56	32		2.01	Spring 2015
2-F	2.08	Corn	150		150	431.48	33.12	S	4.93 DT/A	4.6 DT/A	15.39		9.56	32		2.08	Spring 2015
2-G	1.68	Hay		3	150	667.86	51.26	S	6.58 DT/A	7.12 DT/A	23.81		11.96	40		1.68	Spring 2015
2-H	2.21	Hay		3	150	406.15	31.18	S	6.04 DT/A	4.33 DT/A	14.48		9.56	32		2.21	Spring 2015
Totals	19.62	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.0 DT/A	18.35		98.03	360		19.62	N/A

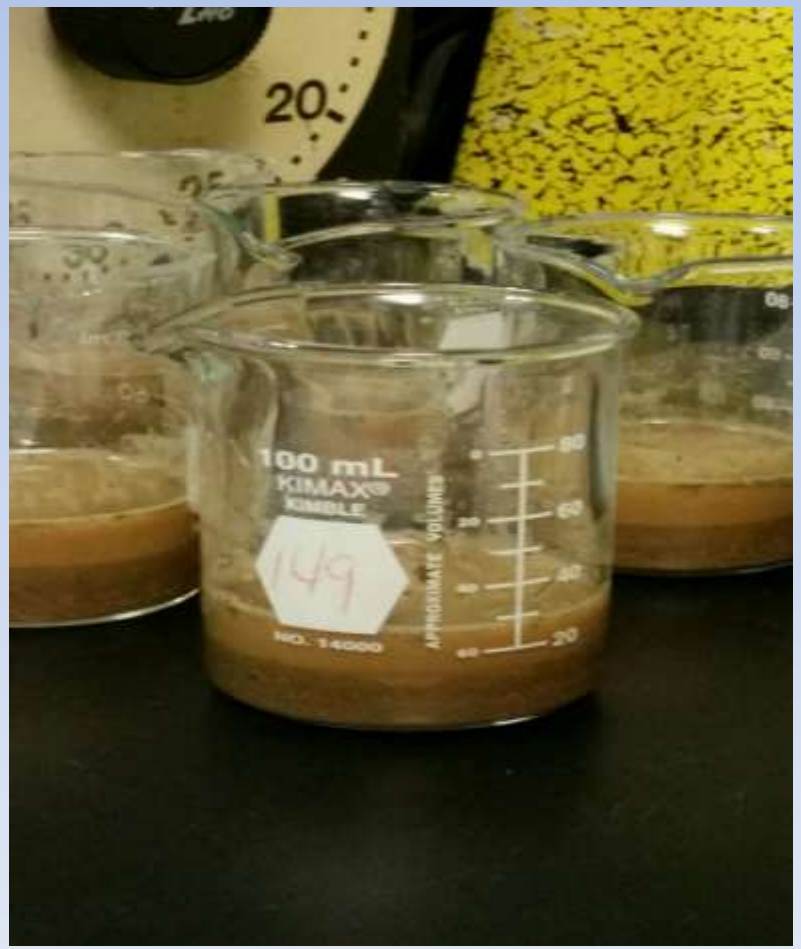
Preparation For Spreading

- Staking out individual fields and restricted zones
- Restricting Access to Fields (+30 days)



Preparation For Spreading

- pH testing of each field to be applied
- pH >6.0 DO THIS



Preparation For Spreading

- pH testing of each field to be applied
- pH >6.0 DO NOT DO THIS

Calculation of Spreader Rates Per Field

- Spreader Pattern? AWA 6 foot width
- Linear Footage Path per Field
- Wet Tons per Acre
- Field Acreage
- Tons per Spreader
- These go into the calculation of the Tractor Speeds and the Ram Speeds of the Spreader

Calculation of Spreader Rates Per Field

Lin Ft/[(WT/Ac *Ac)/T/Load]= Ft per Load
Ft per Load/Tractspd in Ft per min = Ram Spd

Field #	Linear Feet	Wet Tons/A	Field Acre	Field Tons	Tons/Load	#Load/Field	Whole loads	Tons to Farm	L Feet/ Load	2 mph RAM	3mph RAM	4 mph RAM	5 mph RAM	6 mph RAM	7 mph RAM	8 mph RAM
2A	37,725	20.77	5.2	108.00	8	15.429	15	105	2,515.0	14.29	9.53	7.14	5.72	4.76	4.08	3.57
2B	5,270	21.11	0.73	15.41	8	2.201	2	14	2,635.0	14.97	9.98	7.49	5.99	4.99	4.28	3.74
2C	22,400	20.27	3.09	62.63	8	8.948	8	56	2,800.0	15.91	10.61	7.95	6.36	5.30	4.55	3.98
2D	19,002	20.31	2.62	53.21	8	7.602	7	49	2,714.6	15.42	10.28	7.71	6.17	5.14	4.41	3.86
2E	14,571	16.49	2.01	33.14	8	4.735	4	28	3,642.8	20.70	13.80	10.35	8.28	6.90	5.91	5.17
2F	15,126	16.49	2.08	34.30	8	4.900	4	28	3,781.5	21.49	14.32	10.74	8.59	7.16	6.14	5.37
2G	12,169	21.99	1.68	36.94	8	5.278	5	35	2,433.8	13.83	9.22	6.91	5.53	4.61	3.95	3.46
2H	16,070	20.21	2.21	44.66	8	6.381	6	42	2,678.3	15.22	10.15	7.61	6.09	5.07	4.35	3.80
Totals			19.62	388.31				357.0								

What is Ram Speed?
Time to Empty Spreader

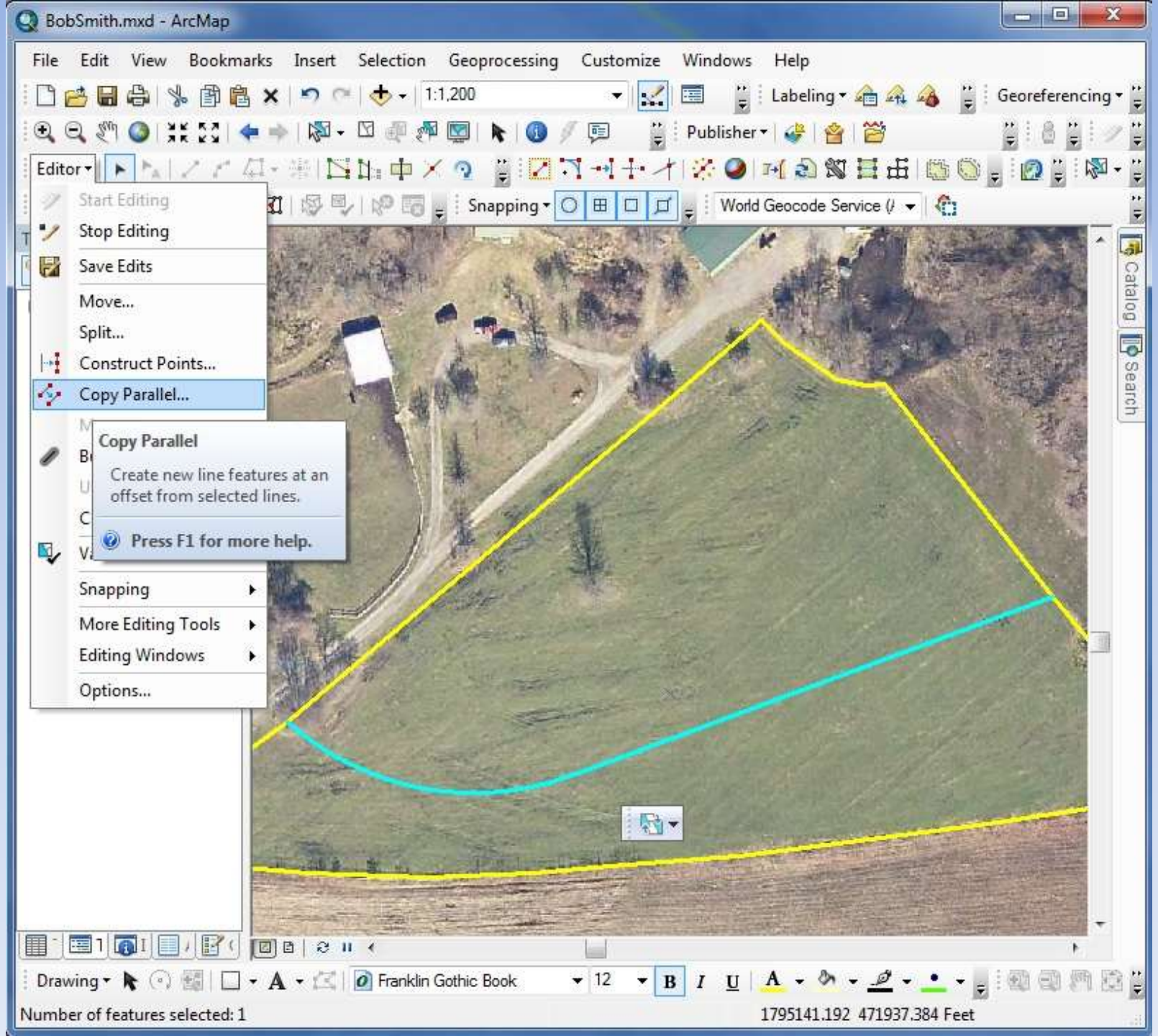

HYDRA - RAM


297


291
JOHN DEERE
544E

Linear Footage Calculations

- Old Way. Take Acreage divided by the average lengths and widths of the fields
- Divide Averages by Spreader Widths (6 ft)
- Hope field is not irregular in shape (good luck)
- New Way. Use GIS mapping and the following process.
- These slides and maps were developed by the AWA GIS Specialist Lisa Kleinosky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Start Editing
Stop Editing
Save Edits
Move...
Split...
Construct Points...
Copy Parallel...
Copy Parallel
Create new line features at an offset from selected lines.
Press F1 for more help.
Snapping
More Editing Tools
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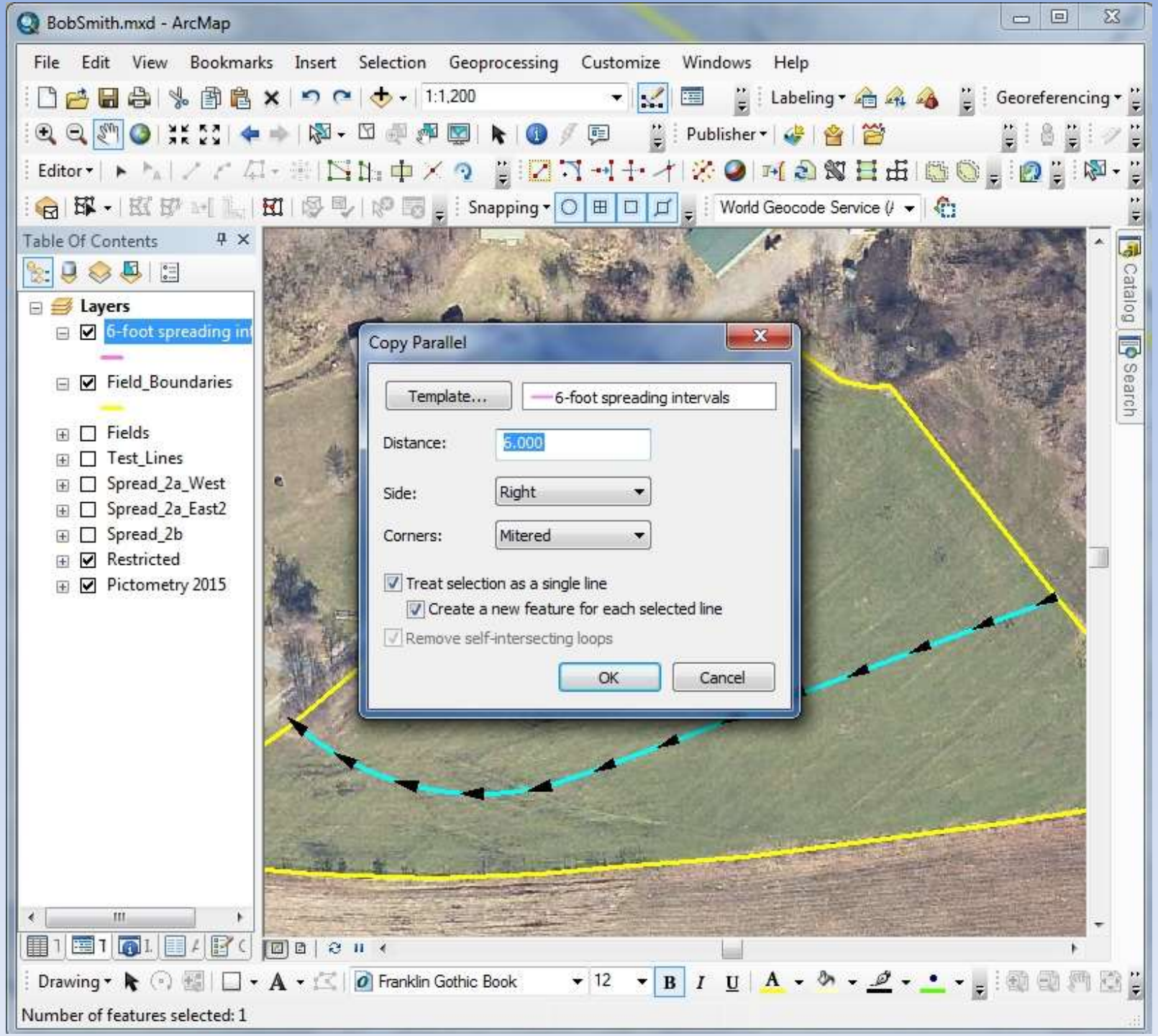
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Layers
6-foot spreading in
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Fields
Test_Lines
Spread_2a_West
Spread_2a_East2
Spread_2b
Restricted
Pictometry 2015
Copy Parallel
Template...
6-foot spreading intervals
Distance:
5.000
Side:
Right
Corners:
Mitered
Treat selection as a single line
Create a new feature for each selected line
Remove self-intersecting loops
OK
Cancel
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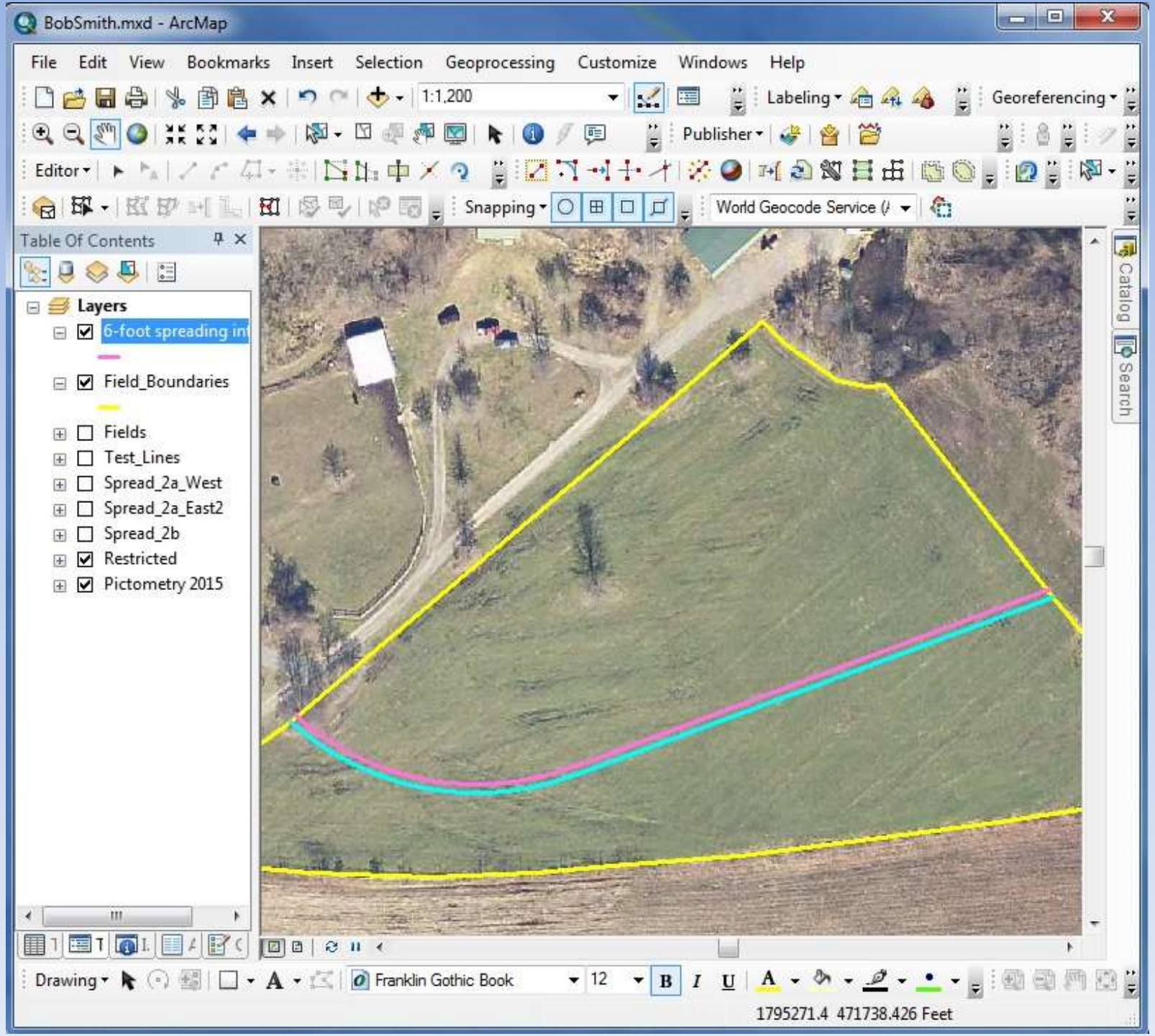
12
Number of features selected: 1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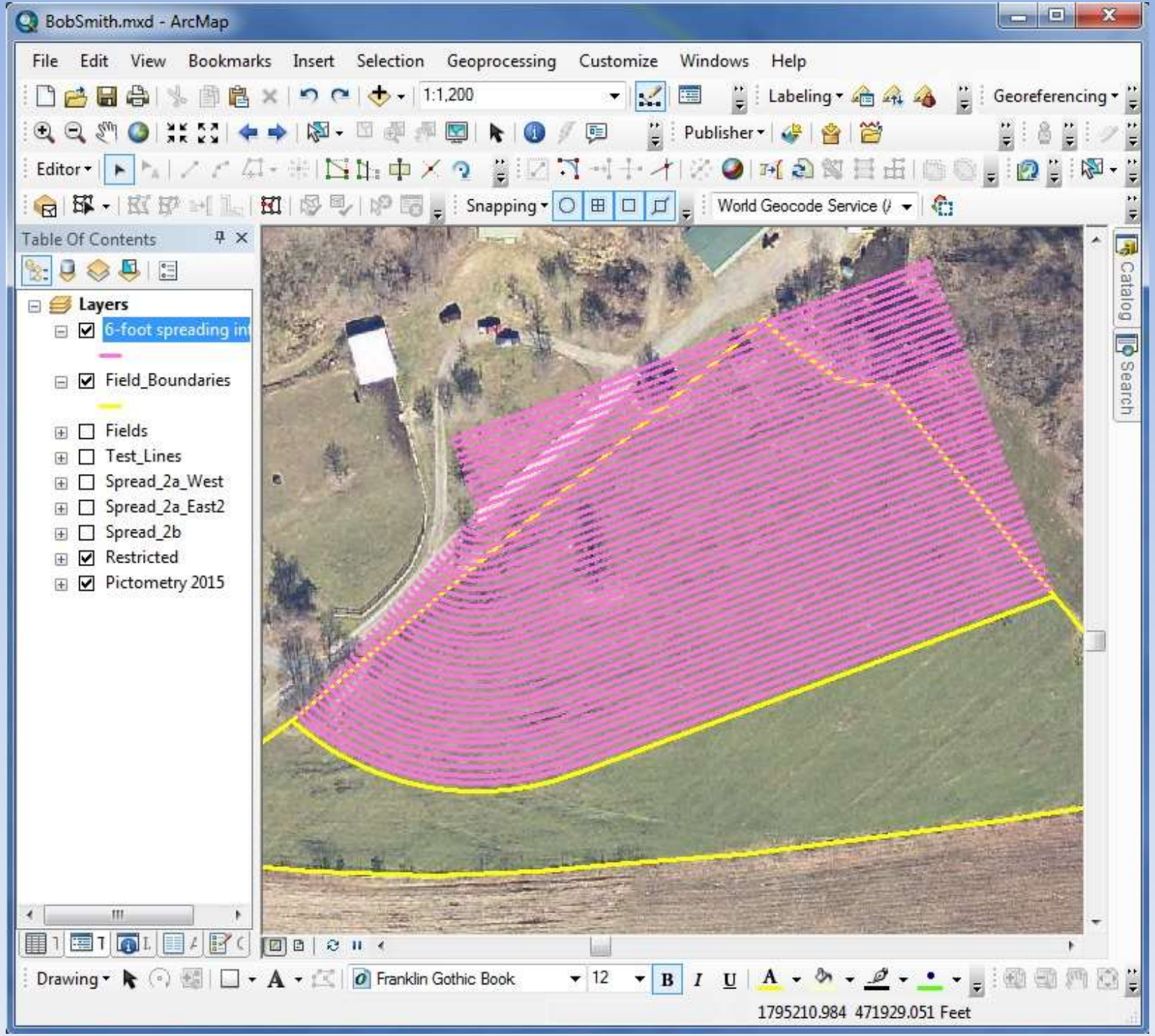
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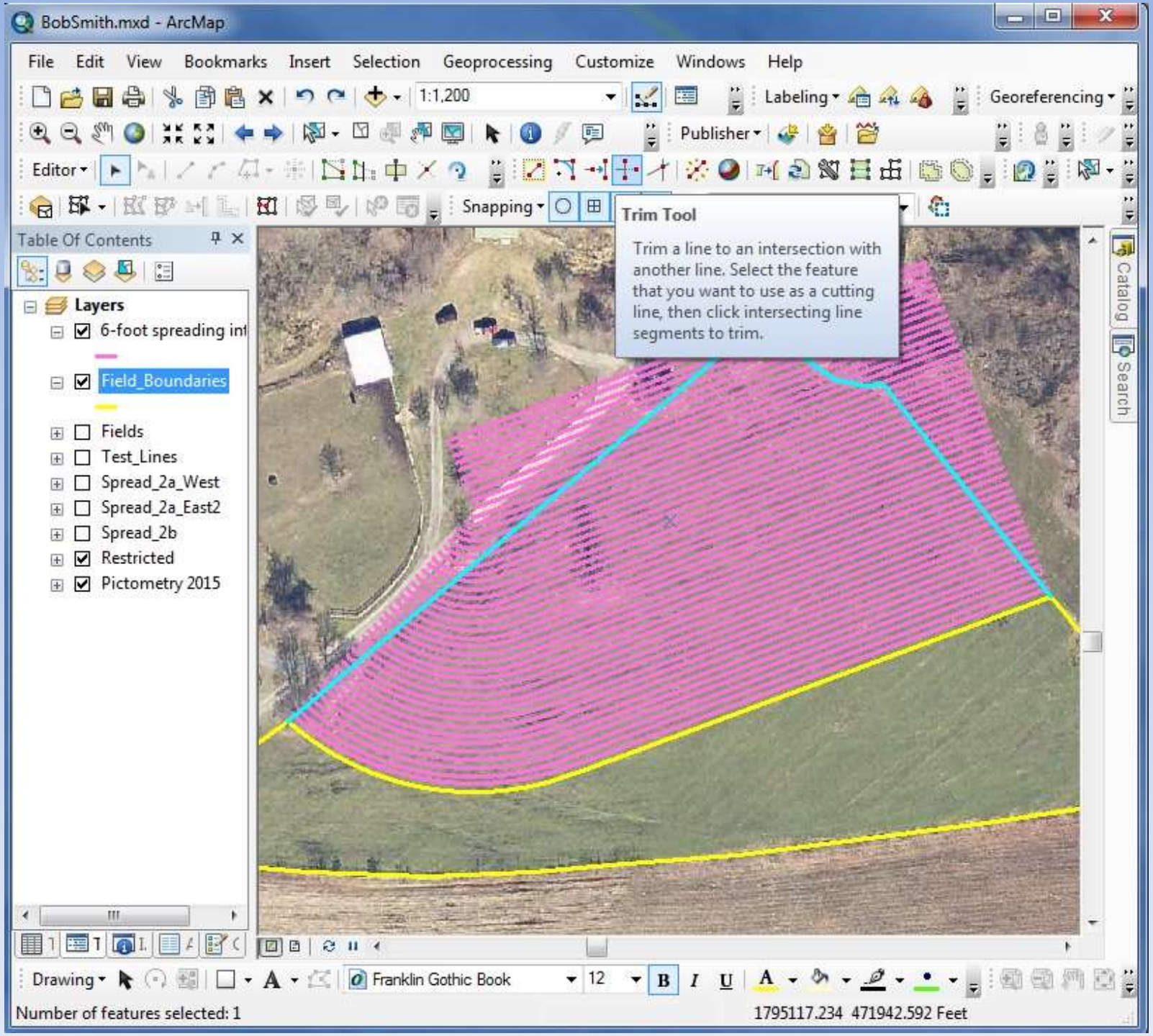
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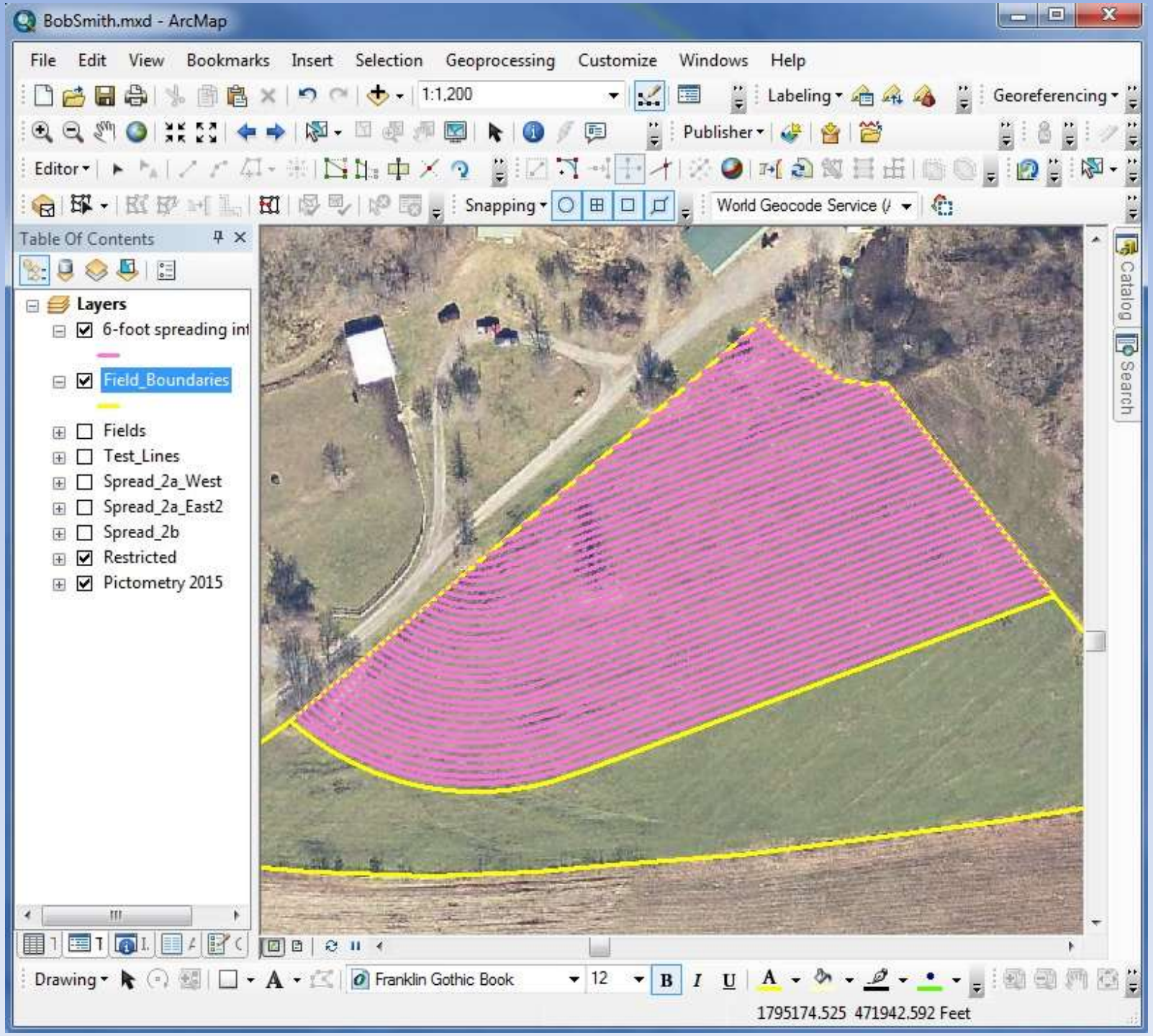
Snapping
Trim Tool
Trim a line to an intersection with another line. Select the feature that you want to use as a cutting line, then click intersecting line segments to trim.
Table Of Contents
Layers
6-foot spreading int
Field_Boundaries
Fields
Test_Lines
Spread_2a_West
Spread_2a_East2
Spread_2b
Restricted
Pictometry 2015
Catalog
Search
Drawing
Franklin Gothic Book
12
Number of features selected: 1
1795117.234 471942.592 Feet


BobSmith.mxd - ArcMap
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
1:1,200
Labeling
Georeferencing
Publisher
Editor
Snapping
World Geocode Service
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Layers
6-foot spreading int
Field_Boundaries
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Spread_2a_East2
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Restricted
Pictometry 2015
Catalog
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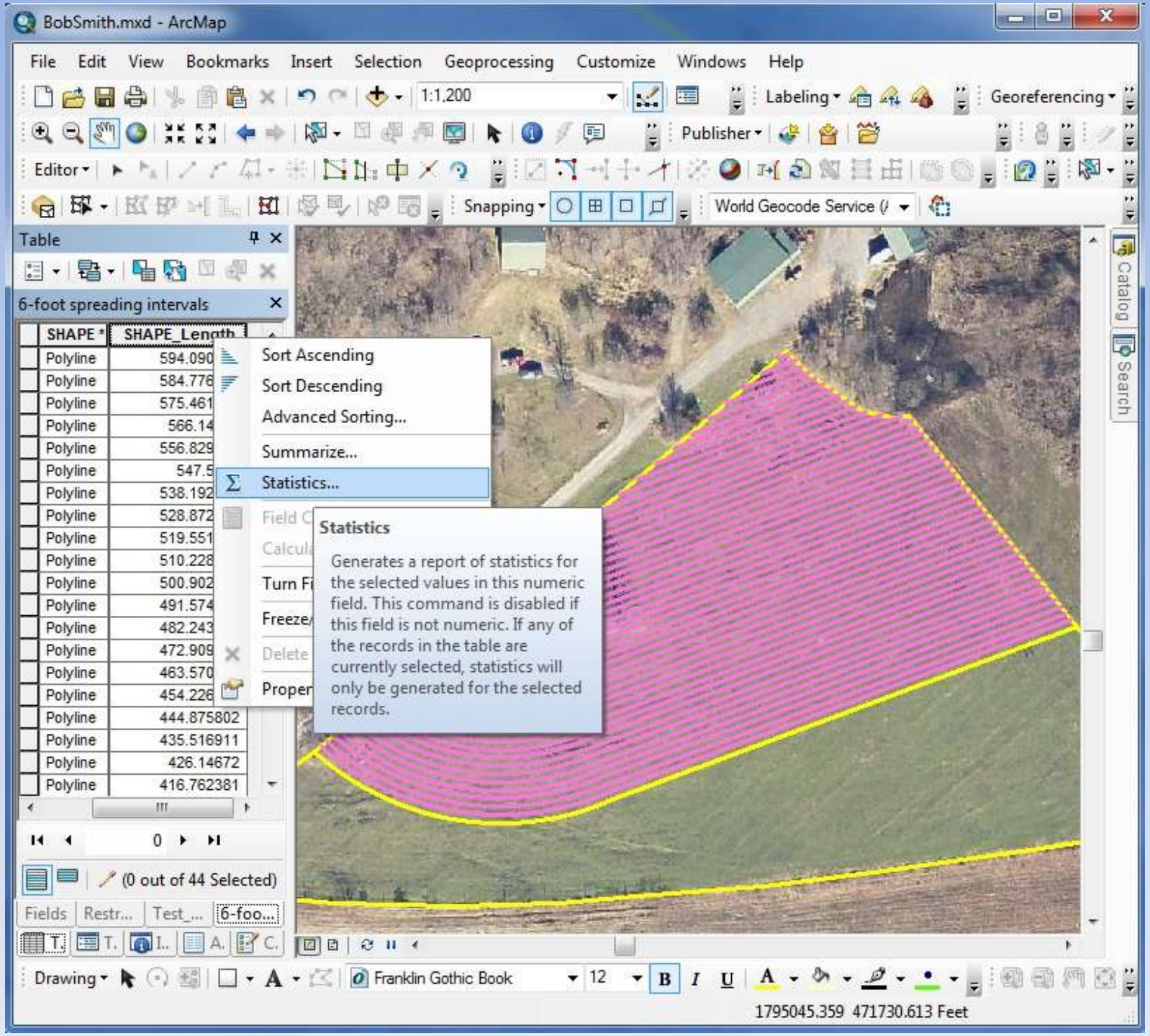
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Labeling
Georeferencing
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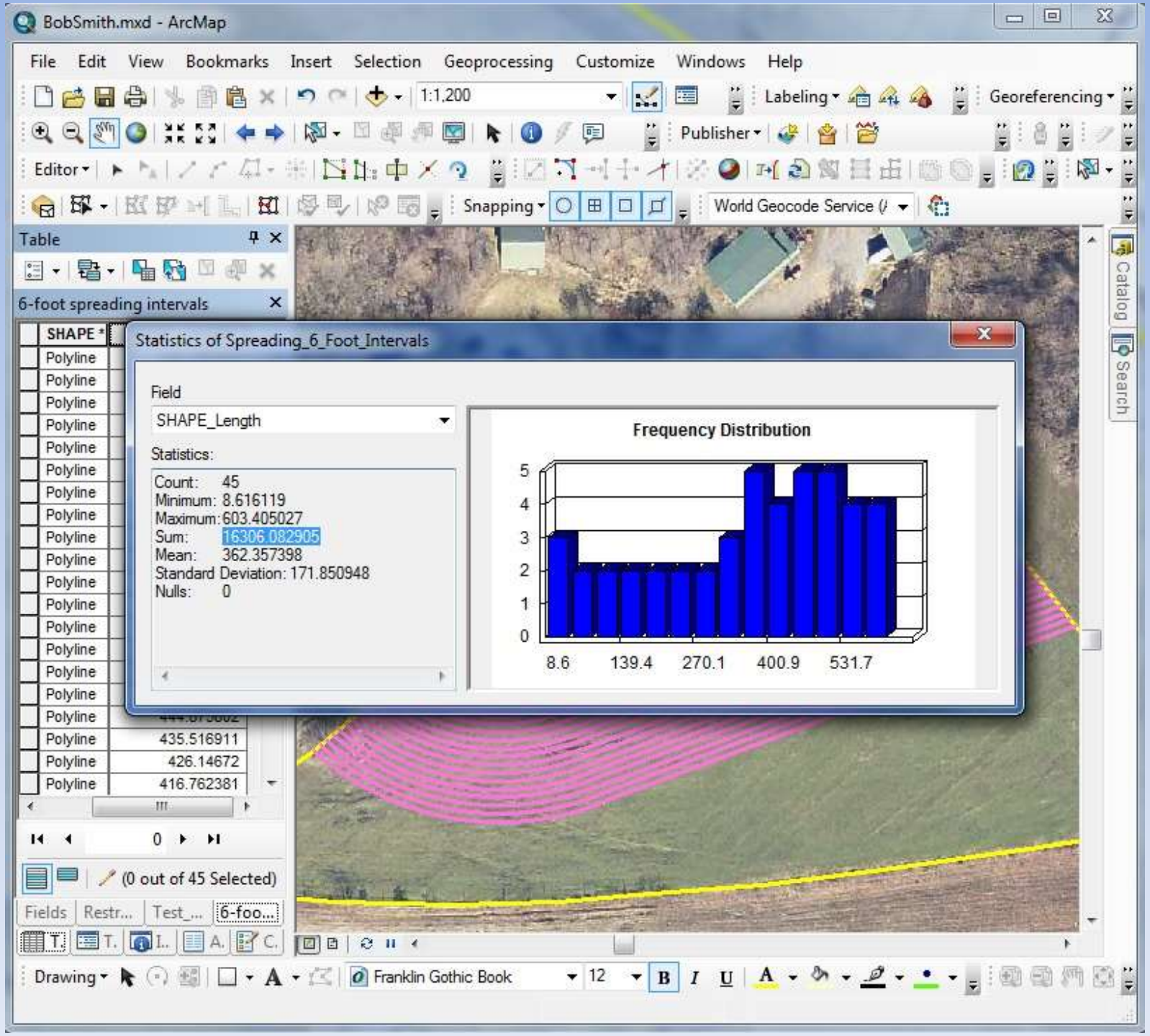
World Geocode Service
Table
6-foot spreading intervals
SHAPE *
SHAPE_Length
Polyline 594.090
Polyline 584.776
Polyline 575.461
Polyline 566.14
Polyline 556.829
Polyline 547.5
Polyline 538.192
Polyline 528.872
Polyline 519.551
Polyline 510.228
Polyline 500.902
Polyline 491.574
Polyline 482.243
Polyline 472.909
Polyline 463.570
Polyline 454.226
Polyline 444.875802
Polyline 435.516911
Polyline 426.14672
Polyline 416.762381
Sort Ascending
Sort Descending
Advanced Sorting...
Summarize...
Statistics...
Field C
Calcula
Turn Fi
Freeze/
Delete
Proper
Statistics
Generates a report of statistics for the selected values in this numeric field. This command is disabled if this field is not numeric. If any of the records in the table are currently selected, statistics will only be generated for the selected records.
0
(0 out of 44 Selected)
Fields Restr... Test_... 6-foo...
Catalog
Search
Drawing
Franklin Gothic Book
12
1795045.359 471730.613 Feet


BobSmith.mxd - ArcMap
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
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Georeferencing
Publisher
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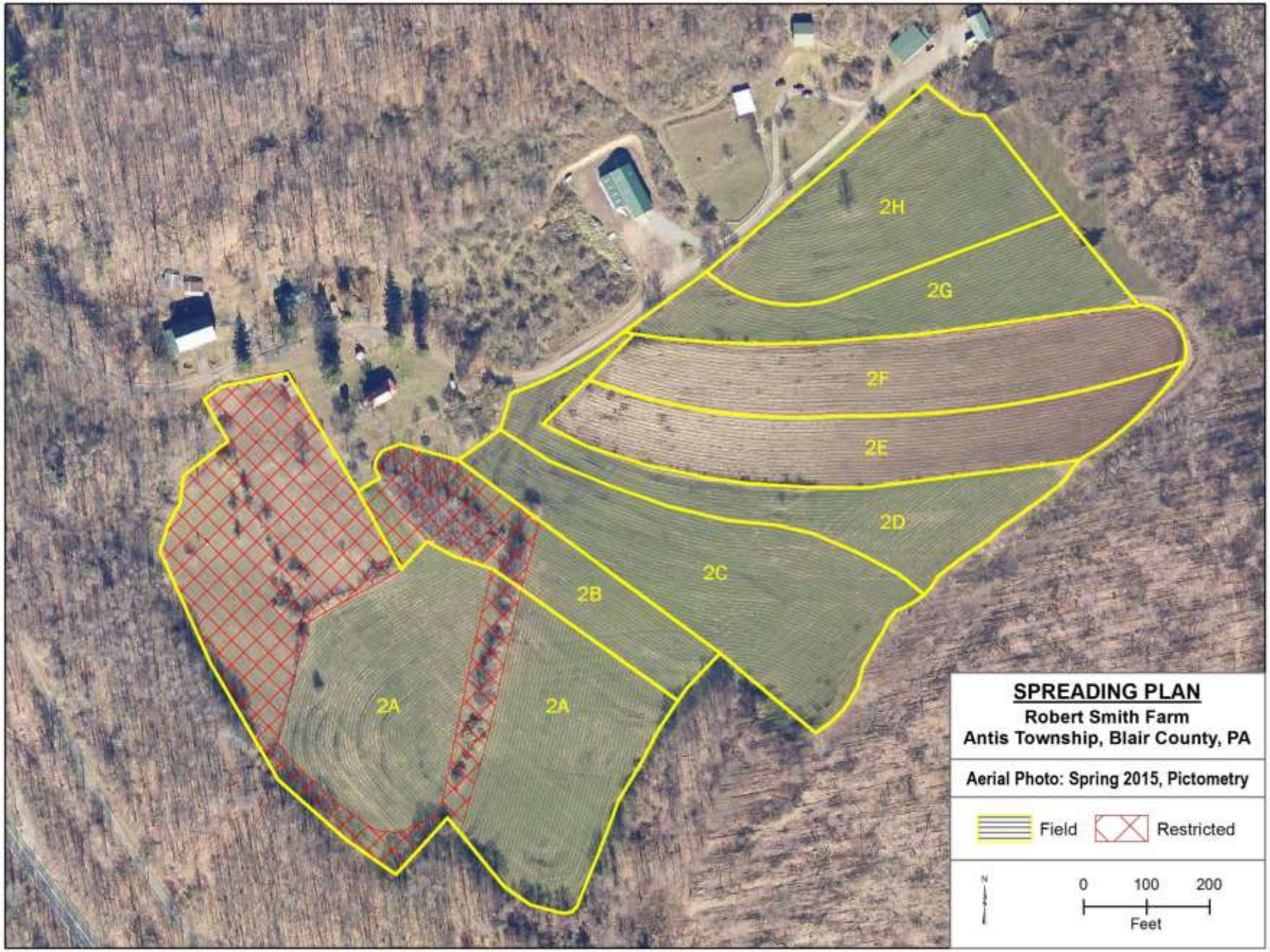
Snapping
World Geocode Service (
Table
6-foot spreading intervals
SHAPE *
Polyline
435.516911
426.14672
416.762381
0
(0 out of 45 Selected)
Fields
Restr...
Test_...
6-foo...
Statistics of Spreading_6_Foot_Intervals
Field
SHAPE_Length
Statistics:
Count: 45
Minimum: 8.616119
Maximum: 603.405027
Sum: 16306.082905
Mean: 362.357398
Standard Deviation: 171.850948
Nulls: 0
Frequency Distribution
5
4
3
2
1
0
8.6
139.4
270.1
400.9
531.7
Catalog
Search
Drawing
Franklin Gothic Book
12

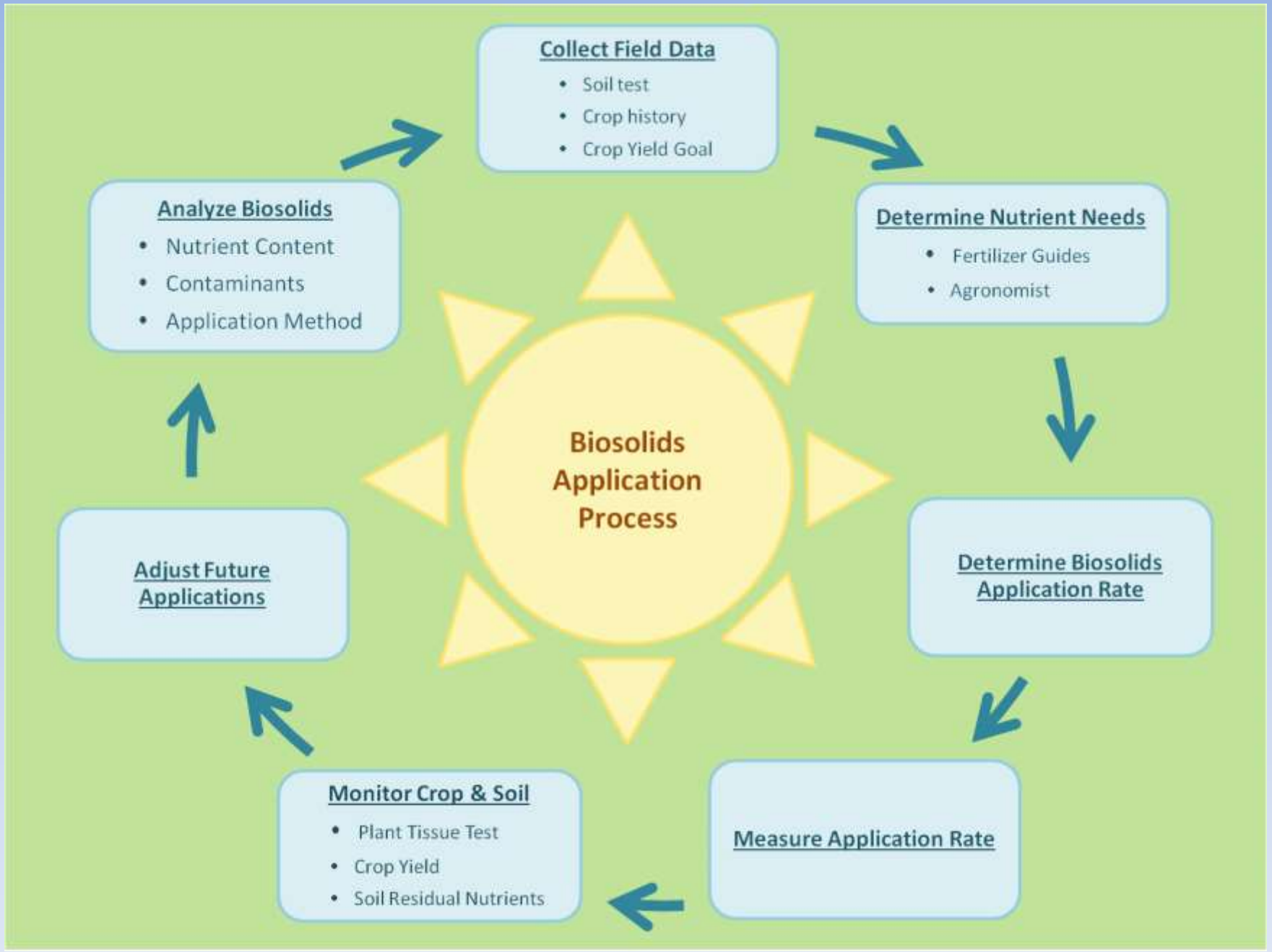

2H
2G
2F
2E
2D
2C
2B
2A
2A
SPREADING PLAN
Robert Smith Farm
Antis Township, Blair County, PA
Aerial Photo: Spring 2015, Pictometry
Field
Restricted
N
0
100
200
Feet

ROBERT SMITH FARM	
Field	Approximate linear length
2A (WEST)	16,778.00
2A (EAST)	16,519.00
2B	5,562.00
2C	20,511.00
2D	13,172.00
2E	16,336.00
2F	18,196.00
2G	12,070.00
2H	16,306.00
TOTAL	135,450.00

End Result

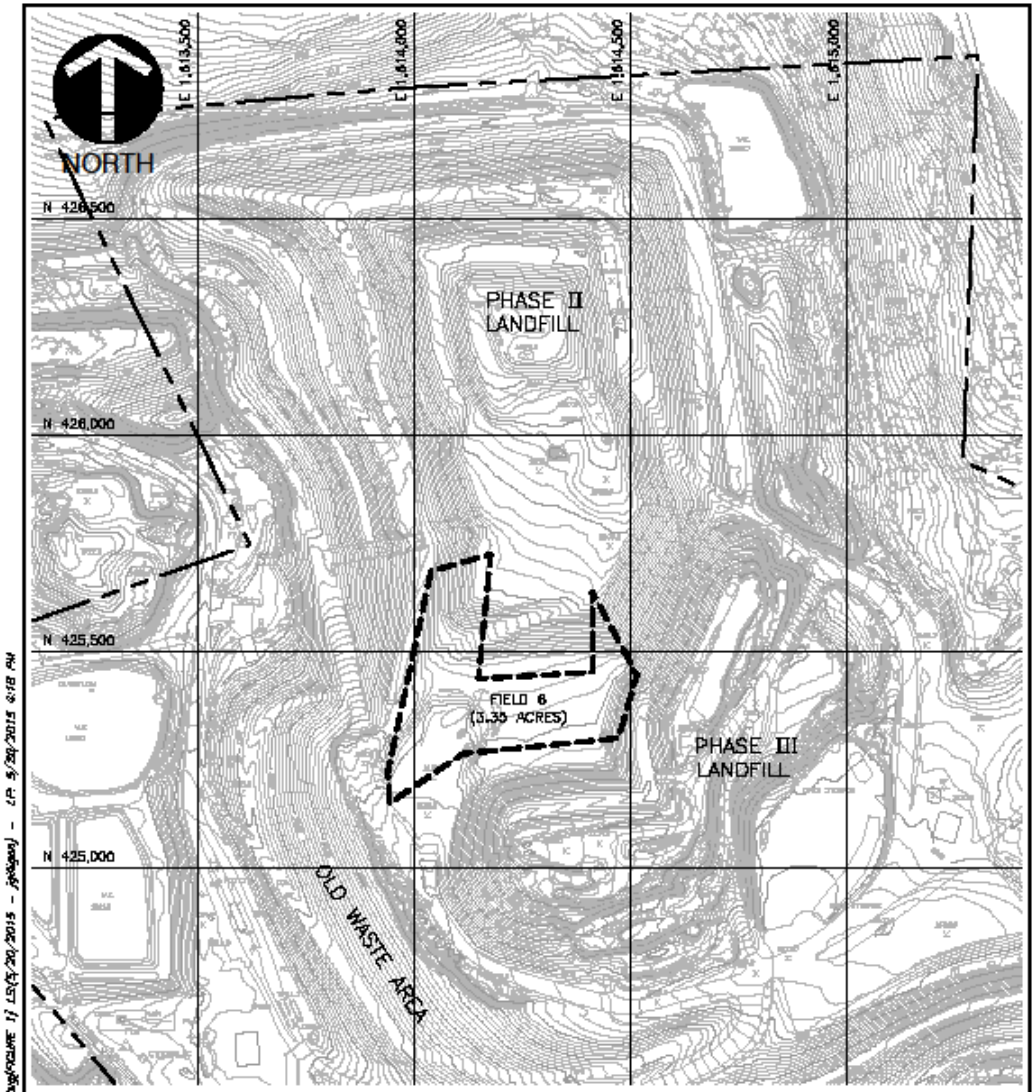
Land Application Site	Biosolids Hauled to Application Site (Dry Metric Tons)
Daniel Hegarty	158.15
Robert Smith	89.12
TOTAL	**247.27**

Land Application Site	Biosolids Hauled to Application Site (Dry Metric Tons)
Bernard Smith Farm	192
Laurel Highlands Landfill	167.6
Evergreen Landfill	80.7
Total	**440.3**


Collect Field Data
Soil test
Crop history
Crop Yield Goal
Determine Nutrient Needs
Fertilizer Guides
Agronomist
Determine Biosolids Application Rate
Measure Application Rate
Monitor Crop & Soil
Plant Tissue Test
Crop Yield
Soil Residual Nutrients
Adjust Future Applications
Analyze Biosolids
Nutrient Content
Contaminants
Application Method
Biosolids Application Process

Landfill Reclamation Option

- Incorporation Option if Biosolids do not meet VAR requirements
- Used to promote cover vegetation growth
- Much higher loading rates per acre
- No spreader calculations with linear footage or with tractor or RAM speeds.
- Material is spread via bulldozer
- Allowed 60 DT/Acre Approx 250 WT/Acre



* HAND SIGNATURE ON FILE

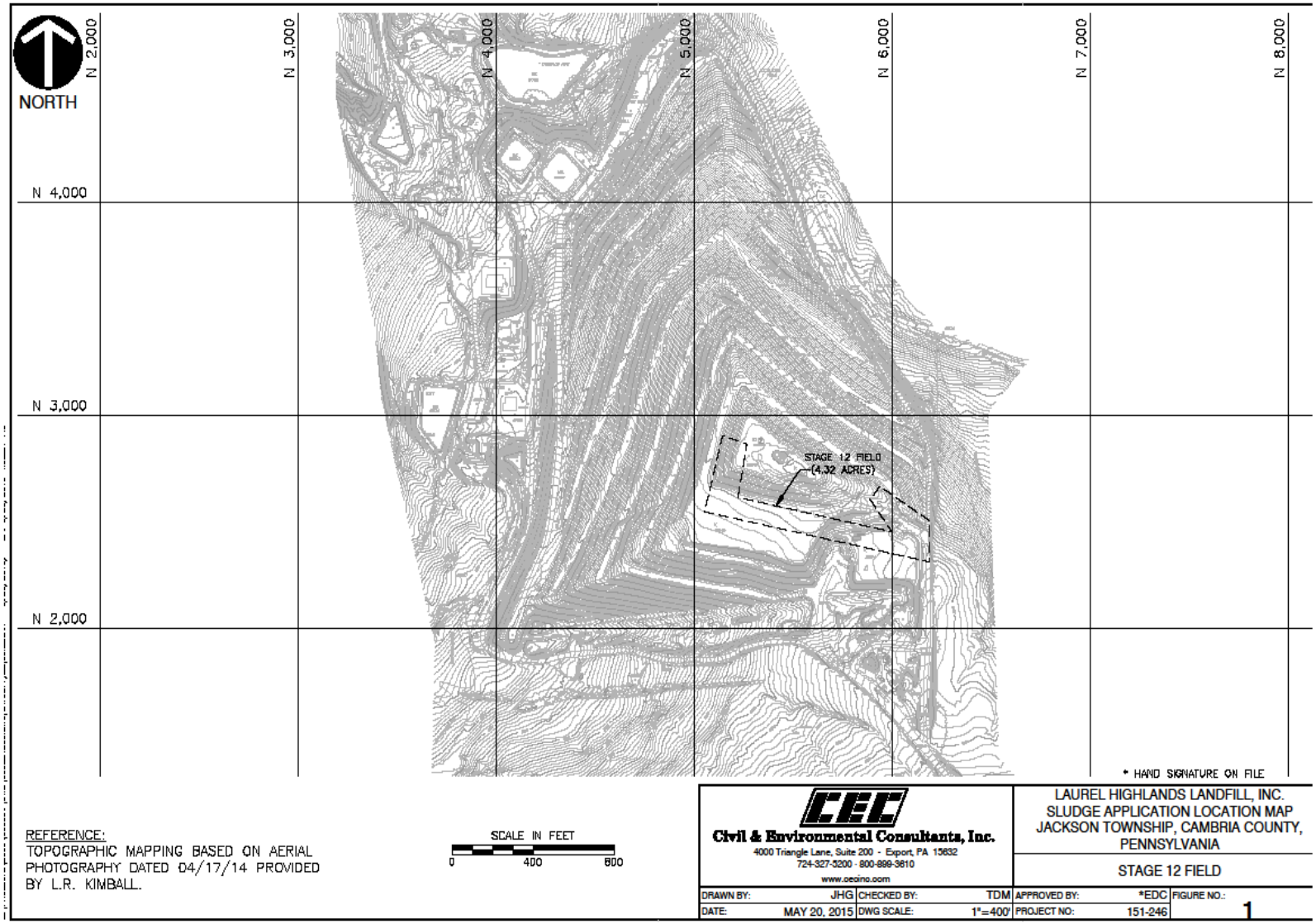
Civil & Environmental Consultants, Inc.
4000 Triangle Lane, Suite 200 - Export, PA 15632
724-327-5200 - 800-899-3610
www.ceoinc.com

EVERGREEN LANDFILL, INC.
SLUDGE APPLICATION LOCATION MAP
CENTER & BRUSH VALLEY TWPS.,
INDIANA COUNTY, PENNSYLVANIA

FIELD 6

DRAWN BY:	JHG	CHECKED BY:	TDM	APPROVED BY:	*EDC	FIGURE NO.:	1
DATE:	MAY 20, 2015	DWG SCALE:	1"=300'	PROJECT NO:	151-246		

G:\Projects\2002\252351\DWG\252351e01.dwg[FIGURE 1] LS(5/20/2015 - jsteigerwald - LP: 5/20/2015 8:18 AM



* HAND SIGNATURE ON FILE

REFERENCE:
TOPOGRAPHIC MAPPING BASED ON AERIAL PHOTOGRAPHY DATED 04/17/14 PROVIDED BY L.R. KIMBALL.

SCALE IN FEET
0 400 800

Civil & Environmental Consultants, Inc.
4000 Triangle Lane, Suite 200 - Export, PA 15632
724-327-5200 - 800-899-3610
www.ceiinc.com

LAUREL HIGHLANDS LANDFILL, INC.
SLUDGE APPLICATION LOCATION MAP
JACKSON TOWNSHIP, CAMBRIA COUNTY, PENNSYLVANIA

STAGE 12 FIELD

DRAWN BY:	JHG	CHECKED BY:	TDM	APPROVED BY:	*EDC	FIGURE NO.:	1
DATE:	MAY 20, 2015	DWG SCALE:	1"=400'	PROJECT NO:	151-246		

Landfill Reclamation Value
Large Quantities of Sludge in Small Areas and Fast Disposal

Land Application Site	Biosolids Hauled to Application Site (Dry Metric Tons)
Bernard Smith Farm	192
Laurel Highlands Landfill	167.6
Evergreen Landfill	80.7
Total	**440.3**

AWA Last Option Landfill Disposal

- Requires Additional Analysis (Form 43)
- Waste Must be Manifested
- Limited Disposal Amounts Per Day
- $$$$$

Major Drawbacks to Land Application

- Public Perception
- Inability to get onto the farm fields (weather, crop production schedule, etc.)
- Unable to apply at the landfill (weather, liner placement, cover schedule)
- Did I mention Public Perception??

Major Drawbacks to Land Application

Benner Township residents disapprove of biosolid application near well

Protesters plan blockade in Kamloops against biosolids dumping

Major Drawbacks to Land Application

Cost Benefit Analysis Assuming All Biosolids Production Costs are Similar

- Most Cost Effective – Landfill Reclamation
  - Only real cost is loading and trucking
  - $210.00 to load and truck to the landfill
  - Approximately $14.00 per Wet Ton to dispose
  - Less regulatory issues
  - Less exposure to public criticism (odor complaints, mud tracking, etc.)

Cost Benefit Analysis Assuming All Biosolids Production Costs are Similar

- Second Most Cost Effective – Land Application
  - Cost of permitting farms
  - Two loaders, trucks, spreader, staking, oversight
  - Approximately $29.00 per Wet Ton to actually apply (Quote of $31.00 per Wet Ton)
  - Reliant on farmer to not change mind on crops or fertilizer rates
  - Exposure to public criticism (odor complaints, mud tracking, etc.)

Cost Benefit Analysis Assuming All Biosolids Production Costs are Similar

- Least Cost Effective – Permitted Landfill Disposal
  - Cost of Form 43 Analysis
  - Approximately $14.00 per Wet Ton to load and truck
  - Approximately $50.00 per Wet Ton to dispose
  - Limited by landfill acceptance amounts

So, why am I here?

- What did you ever step in?
- Compliance issues within the program
  - Foremost Issue. Failure to perform VAR testing in 2013. Monetary penalty
  - Secondary Issue. Applying on soils with a pH <6.0. Resolved by using PSU analysis
  - Over application of Biosolids on farm ground. Resolved with no application in next crop year

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
CLEAN WATER PROGRAM

June 16, 2014

Certified Mail No. 9171 9690 0935 0033 0102 95

Mr. Ryan Beasom
Altoona Water Authority
900 Chestnut Road
Altoona, PA 16601

Re: Noncompliance Biosolids Activity
Altoona Water Authority
Permit Numbers PAG-08-3511, PAG-08-3512
Logan Township, Blair County

Dear Mr. Beasom:

The purpose of this letter is to follow-up on the June 9, 2014, meeting between the Department of Environmental Protection (Department) and the Altoona Water Authority (Altoona). During the meeting, we discussed Altoona's failure to show that vector attraction reduction (VAR) requirements were met prior to the land application of biosolids for time periods in 2013, and associated penalties for settlement purposes. Specifically, the violations are as follows:

1. The Recordkeeping and Reporting Forms submitted to the Department by Altoona for 2013 show a failure to meet VAR requirements prior to land application from the Easterly Wastewater treatment plant for the months of September, October, and November 2013.

2. The Recordkeeping and Reporting Forms submitted to the Department by Altoona for 2013 show a failure to meet VAR requirements prior to land application from the Westerly Wastewater treatment plant for the months of January, July, August, September, October, and November 2013.

Consequently, we are obligated to pursue a settlement for the violations. To accomplish this and in an effort to avoid litigation, we propose settling these matters through execution of a Consent Assessment of Civil Penalty (CACP) in the amount of **$26,080**; and an agreement to give a presentation at a wastewater related conference or other wastewater related public forum discussing the biosolid regulations, Altoona's violations, and how Altoona corrected the violations on or before December 31, 2015. Our penalty assessment was determined following Section 605 of the Clean Streams Law, which takes into consideration the willfulness of the violations, damage to Commonwealth waters, history of non-compliance, economic benefits, and Department costs.

Return to Compliance

- SOUR testing is automatically run on a monthly basis. Early in the month
- SOUR failure automatically triggers an aquarium test
- Biosolids are segregated in separate bays to ensure VAR failures are not surface applied
- Soil pH analysis is all run in lab
- Agronomic loadings are closely monitored

Future of the Program

- Attempt to secure more agricultural land
  - Farmer cooperation
    - Increased distances
    - Cost to permit and still risk a shutdown
  - AWA purchase of Land
    - Control of Crops (multi-crop rotations)
    - Control of Tillable acreage (allow for non-VAR)
    - Control of Synthetic Fertilizer (over application)

Future of the Program

- Class A Potential (Heat drying)
  - Upfront capital expenditures
  - Operations costs
  - Still need to dispose of material

Future of the Program

- Regional Dryer
  - Still have a disposal expense
  - Limited by digester needs
  - Residual Biosolids still need disposed

4. Conclusions

- The Biosolids generated from WWTFs are a nutrient and organic rich material that should be handled and disposed of properly.
- The beneficial use of biosolids through land application is a very viable and cost effective method of disposal that should be considered.
- The quality of biosolids is a function of your wastewater treatment process and any change could affect your ability to use land application.
- The Altoona Water Authority has a very successful biosolids management program and they hope to continue it well into the future.

5. Questions/Discussion

Thank You!

Would you like to leave feedback on this session?
Complete the online form at: www.prwa.com/training-survey

Schedule at http://mobile.prwa.com

Scan the QR code to get Conference information on your phone.

We are on Facebook & Twitter! Follow us! Search: PaRuralWater