Site Hazard Assessment
Worksheet 1
Summary Score Sheet

SITE INFORMATION

Name: True Grit Roofing Granules
Address: 1110 E Alexander Ave
City: Tacoma **County:** Pierce **State:** WA **Zip:** 98421
Section/Township/Range: 26 / 21N / 03E
Latitude: 47.27231 **Longitude:** -122.39694
Facility Site ID Number: 1206878

January 20, 2011

Site Description (Include management areas, substances of concern, and quantities):

General Site Description

The subject site operates on tax parcel 2275200292 and totals approximately five (5.1) acres. The site is zoned "Port Maritime and Industrial" and within the Tide Flats of the City of Tacoma. The *Blair Waterway* is the property's west border and *Greymont Western US Inc.* provides the southeastern border. *Totem Ocean Trailer Expansion Terminal* serves as the property's northern border. With the exception of Greymont Western US Continental Inc., the surrounding properties and the subject property are owned by the Port of Tacoma.

The Tideflats is a subwatershed of the Puyallup watershed. Covering 2,112 acres, the Tideflats is the most highly industrial and commercial section of Tacoma. Wapato Creek discharges into the head of the Blair Waterway.[1] In July 2009, all of Tacoma's 42 miles of shoreline were designated as Fish and Wildlife Habitat Conservation Areas (FWHCA), and associated critical areas protections were put into place. These protections include buffers ranging from 50 to 200 feet and the requirement to obtain a FWHCA permit for all activities in these areas, unless specifically exempted in the Tacoma Municipal Code, Section 13.11.140.[2]

The subject property is used by Tru Grit Roofing Granules, a part of the Kleen Blast Company owned by CanAm Minerals. The Tru Grit Roofing Granules business receives, stores, dries, and screens copper smelter slag brought in by barge from Anyox, located on Grandby Bay in British Columbia, Canada. The slag is then sold to roofing manufacturers and sandblasters. Onsite activities may have impacted the surrounding properties.[3] Currently the Pierce County Assessor-Treasurer profile lists the business name as "Old Jesse Engineering" and describes the land use as the "Fabrication of Metal Products".

[1] http://www.cityoftacoma.org
[2] 2009 Annual Amendment Application No. 2009-02 Critical Areas Preservation Code Amendments
[3] Washington State Department of Ecology Early Notice Letter, August 13, 2009.

The site is underlain by a layered sequence of unconsolidated silts and sands. Of these materials, the upper several feet represents hydraulic fill material from past dredging of nearby waterways.[4] Subsurface conditions at the subject property consist of fill material to a depth of approximately twenty feet below ground surface (20' bgs). Review of several nearby resource protection wells indicate that groundwater is encountered at depths as shallow as ten to twenty feet (10' -20') bgs. These are typical subsurface characteristics for properties located n the Tide Flats.

The closest active groundwater drinking well is a Group A Municipal Water System (City of Tacoma) that is approximately one thousand eight hundred eighty five feet (1885') to the northeast and has a depth of approximately seven hundred eighty feet below ground surface (779' bgs). The Tru Grit Roofing Granule site is adjacent to the Blair Waterway and a residential population of approximately five hundred thirty three (533) people lives within one half mile (0.5 mile).

Site History

A series of site inspections was performed by the Washington State Department of Ecology (Ecology) from early 1990s to October 2006. The purpose of these inspections was to ensure compliance with Tru Grit Roofing Granule's Industrial General Stormwater Permit and, later, the July 31, 1996 Stormwater Pollution Prevention Plan (SWPP).[5] Specific concerns included a large pile of slag grit that had been identified as being exposed to stormwater, and was not being adequately contained. The grit was believed to have spread to adjacent sites operated, at the time, by Jesse Engineering and Totem Ocean Trailer Express.

Subsequent sampling and analysis of Tru Grit Roofing Granule's stormwater runoff indicated that concentrations of Arsenic, Copper, and Zinc were above their permit's benchmark and action level concentrations.

As a result, on January 8, 2007, Ecology issued an Order outlining three violations and necessary corrective actions. A brief summary of the required corrective actions and associated timelines are outlined below:

- Comply with the stormwater monitoring and reporting requirements in permit conditions S4 and S5. The Discharge Monitoring Report for the first quarter of 2007 was due no later than May 15, 2007.
- Tru Grit Roofing Granules was to submit a revised SWPP within 30 days of receipt of the Order. The revised SWPP was to include implementation of three additional enhanced Best Management Practices (BMPs).
- Submit a Scope of Work for the evaluation of sediment contamination in the Blair Waterway in areas where slag grit is offloaded. Sample analysis was to include Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, and Zinc.[6]

On May 21, 2008, Ecology submitted thirteen sediment samples collected from the subject site's shoreline sediments. Analytical results of these samples indicate that site sediments have concentrations of; Arsenic in concentrations ranging from 7.94 mg/kg dw to 185 mg/kg dw,

[4] http://www.epa.gov/
[5] Permit Number SO3001497.
[6] Administrative Order 4003

Copper in concentrations ranging from 55.4 mg/kg dw to 1390 mg/kg dw, and Zinc in concentrations ranging from 86 mg/kg dw to 4210 mg/kg dw.[7]

On July 22, 2009, the environmental consulting firm Landau Associates (Landau) submitted a Sediment Sampling and Analysis Results Report in response to Ecology's Administrative Order to evaluate whether raw slag material from the subject site has been discharged into the Blair Waterway. The results of the report conclude that raw slag has been discharged to the waterway in a limited area. The sampling conducted by Landau was in conjunction with the aforementioned May 21, 2008 sampling conducted by Ecology.

The samples collected by both Ecology and Landau indicate that Cooper and Zinc exceed the Sediment Quality Standards (SQSs)[8] and the Cleanup Screening Levels (CSLs)[9] in multiple locations within the sampled area.[10] The concentrations derived from the collected samples exceed the current SQSs and CSLs for the contaminants of concern

On August 13, 2009, Ecology issued an Early Notice Letter stating that the subject site was being added to Ecology's Confirmed or Suspected Contaminated Sites list (CSCSL) found in the Integrated Site Information System (ISIS) database as a State Cleanup Site with a status of awaiting a Site Hazard Assessment (SHA).

Special Considerations (Include limitations in site file data or data which cannot be accommodated in the model, but which are important in evaluating the risk associated with the site, or any other factor(s) over-riding a decision of no further action for the site):

The current Washington Ranking Method (WARM) used in scoring SHAs has no provisions for "Sediment Route". The analytical data discussed in this SHA is primarily sediment data. The scorer has interpreted the confirmed sediment contamination to be a confirmation of a release to the Surface Water Route.

The scorer has included the volume of potentially contaminated sediment to be available to the underlying groundwater route, but not a confirmation of a release to the groundwater route.

The scope of this Site Hazard Assessment did not include a hydrogeologic survey of the subject site and surrounding area. The groundwater contamination documented or inferred at the subject site is therefore considered to have the potential to impact any well located within the prescribed 2-mile radius and all such wells were used in the scoring process.

[7] Manchester Environmental Laboratory Project Number 136608
[8] WAC 173-204-320(a)
[9] WAC 173-204-520(b)
[10] Report Tru-Grit Facility Sediment Sampling and Analysis Results Tacoma, Washington. July 22, 2009. Landau Associates.

ROUTE SCORES:

Surface Water/Human Health:	**46.9**	Surface Water/Environ.	**78.5**
Air/Human Health:	**10.4**	Air/ Environmental:	**16.5**
Ground Water/Human Health:	**70.5**		

OVERALL RANK: 1

Worksheet 2--Route Documentation

1. SURFACE WATER ROUTE:

a. List those substances to be considered for scoring: **Source: 1,2,3**

Arsenic, Copper, Lead, and Zinc

b. Explain basis for choice of substances(s) to be used in scoring:

Arsenic, Copper, and Zinc will be used to score this site due to available analytical data, and that constituents are available to the Surface Water route due to less than perfect containment.

c. List those management units to be considered for scoring: **Source: 1,2,3**

Spills, Discharges, and Contaminated Soil

d. Explain basis for choice of unit to be used in scoring:

Spills, Discharges, and Contaminated Soil Contamination will be the management unit used for scoring due to analytical confirmation of contaminated sediments in contact with surface water.

2. AIR ROUTE:

a. List those substances to be considered for scoring: **Source: 1,2,3**

Arsenic, Copper, and Zinc

b. Explain basis for choice of substances(s) to be used in scoring:

Arsenic, Copper, Lead, and Zinc will be used to score this site due to documented poor management practices, geographic location (ASARCO Smelter Plume), and that constituents are available to the air route due to less than perfect containment.

c. List those management units to be considered for scoring: **Source: 1,2,3**

Spills, Discharges, and Contaminated Soil

d. Explain basis for choice of unit to be used in scoring:

Spills, Discharges, and Contaminated Soil Contamination will be the management unit used for scoring due to availability of contaminants and less than perfect containment.

3. GROUND WATER ROUTE:

a. List those substances to be considered for scoring: **Source: 1,2,3**

Arsenic, Copper, and Zinc

b. Explain basis for choice of substances(s) to be used in scoring:

Arsenic, Copper, and Zinc will be used to score this site due to available analytical data, and the fact that the constituents are available to the Groundwater route due to less than perfect containment.

c. List those management units to be considered for scoring: **Source: 1,2,3**

Spills, Discharges, and Contaminated Soil

d. Explain basis for choice of unit to be used in scoring:

Spills, Discharge, Contaminated Soil will be the management unit used for scoring due to the availability of contaminants and less than perfect containment.

Worksheet 4 - Surface Water Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

	Substance	Drinking Water Standard (ug/1)	Val.	Acute Toxicity (mg/kg-bw)	Val.	Chronic Toxicity (mg/kg-bw)	Val.	Carcinogenicity WOE	Carcinogenicity PF*	Val.
1	Arsenic	10	8	763 (rat)	5	0.001	5	A	1.75	6
2	Copper	1300	2	--	ND	0.037	1	--	--	ND
3	Zinc	4000	2	--	ND	0.2	1	--	--	ND
4										
5										
6										

*Potency Factor

Source: 3

Highest Value: 10 (Max=10

Plus 2 Bonus Points? 2

Final Toxicity Value: 12 (Max=12

1.2 Environmental Toxicity

	Substance	☐ Freshwater ☒ Marine Acute Water Quality Criteria	Value	Non-human Mammalian Acute Toxicity (mg/kg)	Value
1	Arsenic	69	6		
2	Copper	2.9	8		
3	Zinc	95	6		
4					
5					
6					

Source: 2

Value: 8 (Max 10)

1.3 Substance Quantity

Substance Quantity: 5750 cubic yards (2,501 – 12,500 cubic yards)

Explain Basis: Conservative estimated based on the areal extent of potentially contaminated sediments with an assumed five foot depth.

Source: 2

Value: 8 (Max 10)

Worksheet 4 (cont'd)

2.0 MIGRATION POTENTIAL		SOURCE	VALUE
2.1	**Containment** Spills, Discharge, and Contaminated Soil **Explain Basis:** No run-on run-off control , located outside	2	10 (Max = 10)
2.2	**Surface Soil Permeability:** adjacent to surface water	2	7 (Max = 7)
2.3	**Total Annual Precipitation:** 35 inches	9,11	3 (Max = 5)
2.4	**Max. 2-Yr/24-hour Precipitation:** > 2-4	2	3 (Max = 5)
2.5	**Flood Plain:** FEMA Zone A, 100 year flood plain	11	2 (Max = 2)
2.6	**Terrain Slope:** Adjacent to Surface Water, ~ 13%	11	5 (Max = 5)

3.0 TARGETS		SOURCE	VALUE
3.1	**Distance to Surface Water:** Adjacent to Blair Waterway, which drains into Puget Sound.	11	10 (Max = 10)
3.2	**Population served within 2 miles (See WARM Scoring Manua regarding direction): √ pop.= √ 0 = 0**	11	0 (Max = 75)
3.3	**Area irrigated within 2 miles: (0.75) √ no. acres = (Refer to note in 3.2.) : (0.75) √ 0 = 0**	11	0 (Max = 30)
3.4	**Distance to nearest fishery resource:** < 1,000 ft	11	12 (Max = 12)
3.5	**Distance to, and name(s) of, nearest sensitive environment(s)** < 1,000 ft, Blair Waterway	11	12 (Max = 12)

4.0 RELEASE	Source	Value
Explain basis for scoring a release to surface water: Release confirmed through aquatic sediment samples in contact with surface water.	1	5 (Max = 5)

Worksheet 5 – Air Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Introduction (WARM Scoring Manual) - Please review before scoring

1.2 Human Toxicity

	Substance	Air Standard (ug/m^3)	Val	Acute Toxicity (mg/m^3)	Val	Chronic Toxicity (mg/kg/day)	Val	Carcinogenicity		Val
								WOE	PF*	
1	Arsenic	0.00023	10	--	ND	--	ND	A	50	9
2	Copper	3.3	9	--	ND	--	ND	--	--	ND
3	Zinc	--	ND	--	ND	--	ND	--	--	ND
4										
5										

***Potency Factor**

Source: 3

Highest Value: 10 (Max=10)

Plus 2 Bonus Points? 2

Final Toxicity Value: 12 (Max=12)

Mobility (Use numbers to refer to above listed substances)

1.3.1 Gaseous Mobility	1.3.2 Particulate Mobility
Vapor Pressure(s) (mmHg):	**Soil Type:** Gravelly sand
1=	**Erodibility:** 22
2=	**Climatic Factor:** 1-10
3=	**Particulate Mobility Potential:** 0
4=	
5=	

Source: 3

Value: 0 (Max = 4)

1.3.3 Highest Human Health Toxicity/Mobility Matrix Value (from Table A-7)

Final Matrix Value: 3 (Max = 24)

Worksheet 5 (cont'd)

1.5 Environmental Toxicity Mobility

	Substance	Non-Human Mammalia Inhal. Toxicity (mg/ m^3)	Acute Value	Mobility (mmHg)	Value
1	Arsenic	N/A	--	--	--
2	Copper	N/A	--	--	--
3	Zinc	N/A	--	--	--
4			--	--	--
5					

Highest Environmental Toxicity/Mobility Matrix Value (From Table A-7) equals
Final Matrix Value: N/A
(Max= 4)

1.6 Substance Quantity: >1.55 – 7.8 Acres (~2) **Explain basis:** Conservative estimate based on the areal extent of non maintained engineered cover.	**Source:** 11	**Value: 7** (Max=10)

1.0 MIGRATION POTENTIAL

2.1 Containment: Spills, Discharge, and Contaminated Soil. No cover, spills directly to ground, no vapor/particulate collection system.	**Source:** 1, 2	**Value: 10** (Max=10)

2.0 TARGETS

3.1	**Nearest Population:** <1,000 ft	**Source:** 2, 11	**Value: 10** (Max=10)
	Distance to, and name(s) of, nearest sensitive environment(s): 562 ft to Potential Wildlife Critical Habitat	**Source:** 2, 11	**Value: 7** (Max=7)
3.2	**Population within 0.5 miles:** $\sqrt{}$ **pop.** = $\sqrt{623}$ = 24.69	**Source:** 2, 11	**Value: 25** (Max=75)

3.0 RELEASE

Explain basis for scoring a release to air: No confirmed release.	**Source:** 1, 2	**Value: 0** (Max.=5)

Worksheet 6 – Ground Water Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity

	Substance	Drinking Water Standard (ug/1)	Val	Acute Toxicity (mg/kg-bw)	Val	Chronic Toxicity (mg/kg/day)	Val	Carcinogenicity		Val
								WOE	PF*	
1	Arsenic	10	8	763 (rat)	5	0.001	5	A	1.75	6
2	Copper	0.2	10	50(rat)	10	--	ND	B2	12	7
3	Zinc	160	4	490 (rat)	5	0.004	3	--	--	ND
4										
5										
6										

***Potency Factor**

Source: 2, 3

Highest Value: 10 (Max=10)

Plus 2 Bonus Points? 2

Final Toxicity Value: 12 (Max=12)

1.2 Mobility (Use numbers to refer to above listed substances)

Cations/Anions:	OR Solubility (mg/1):
1= **Arsenic = 3** (K = > 1.0)	1=
2= **Copper = 2** (K = 0.1 – 1.0)	2=
3= **Zinc = 3** (K = > 1.0)	3=
4=	4=
5=	5=
6=	6=

Source: 2, 3

Value: 3 (Max=3)

1.3 Substance Quantity: 15,430 cubic yards (>5,000 – 50,000 cubic yards)

Explain basis: Estimated quantity is based on the sum of the areal extent of non maintained engineered cover with an estimated three foot depth (9680 cubic yards) and the areal extent of potentially contaminated sediments with an estimated five foot depth (5750 cubic yards).

Source: 1, 2

Value: 5 (Max=10)

Worksheet 6 (cont'd)

2.0 MIGRATION POTENTIAL

2.1	**Containment** Spills, Discharges, and Contaminated Soil or Waste Pile [no liner (3), no cover (2), no leachate collection system (2), no run-on/runoff control present (3)] **Explain basis:** Historical discharges of contaminants due to poor management practices and potentially contaminated material stored above grade.	**Source:** 1, 2	**Value:** 10 (Max = 10)
2.2	**Net precipitation:** (Nov. – Apr.) 22.9 inches (29.3'' – 6.4'')	**Source:** 2, 9	**Value:** 3 (Max = 5)
2.3	**Subsurface hydraulic conductivity:** Compact fill material of dredged sandy silts.	**Source:** 1, 2	**Value:** 3 (Max = 4)
2.4	**Vertical depth to ground water:** 10-20 **feet**	**Source:** 1,2,7	**Value:** 8 (Max = 8)

3.0 TARGETS

3.1	**Ground water usage:** Aquifer Recharge Area, public supply; no alternate unthreatened sources available with minimal hook ups.	**Source:** 2, 11	**Value:** 9 (Max = 10)
3.2	**Distance to nearest drinking water well:** 1885' **feet.** (City of Tacoma Well)	**Source:** 2,7,11	**Value:** 5 (Max = 5)
3.3	**Population served within 2 miles:** √ **pop.** = √ 359811 = >100	**Source:** 2,8,11	**Value:** 100 (Max = 100)
3.4	**Area irrigated by (groundwater) wells within 2 miles:** **(0.75)** √ 118 **No. acres** = 10.86 = 11	**Source:** 2, 6	**Value:** 11 (Max = 50)

4.0 RELEASE

Explain basis for scoring a release to ground water: No release confirmed.	**Source:** 1, 2	**Value:** 0 (Max = 5)

Sources Used in Scoring

1. Tacoma-Pierce County Health Department Site Hazard Assessment File/Ecology TCP File
2. Washington State Department of Ecology, WARM Scoring Manual, April 1992.
3. Washington State Department of Ecology, Toxicology Database for Use in Washington Ranking Method Scoring, January 1992.
4. U.S. Department of Interior Geological Survey Topographical Map
5. Soil Survey of Pierce County, U.S.D.A. Soil Conservation Service
6. Water Rights Information System (WRIS), Ecology
7. Department of Ecology/Tacoma-Pierce County Health Department Well Logs
8. Washington State Department of Health Public Water Supply System
9. Washington Climate for Pierce County, National Weather Service Forecast Office
10. Department of Fish and Wildlife, Catalog of Washington Streams and Salmon
11. Pierce County Geographic Information System Countyview Database

Washington Ranking Method
Route Scores Summary and Ranking Calculation Sheet

Site Name: True Grit Roofing Granules

Street, City, County: 1110 E Alexander, Tacoma, Pierce

Ecology FS ID#: 1206878 Ecology Region: Southwest

This site was (X) ranked, ( ) reranked, on January 20, 2010 based on quintile values from a total of 1121 assessed/scored sites.

Pathway	Route Scores	Quintile Group #	Priority Scores:
SW-HH	46.9	5	$H^2 + 2M + L/8 = 4.625 = 5$
Air-HH	10.4	2	
GW-HH	70.5	5	
SW-En	78.5	5	$H^2 + 2L/7 = 4.14 = 5$
Air-En	16.5	2	

Use the matrix presented below, along with the two priority scores, to determine the site ranking. N/A refers to where there is no applicable pathway.

Human Health	**Environmental**					
	5	**4**	**3**	**2**	**1**	**N/A**
5	1	1	1	1	1	1
4	1	2	2	2	3	2
3	1	2	3	4	4	3
2	2	3	4	4	5	3
1	2	3	4	5	5	**5**
N/A	3	4	5	5	5	NFA

DRAFT / FINAL

Matrix (bin) Ranking: 1, or _____ **No Further Action**

Confidence Level: The relative position of this site within this bin is:

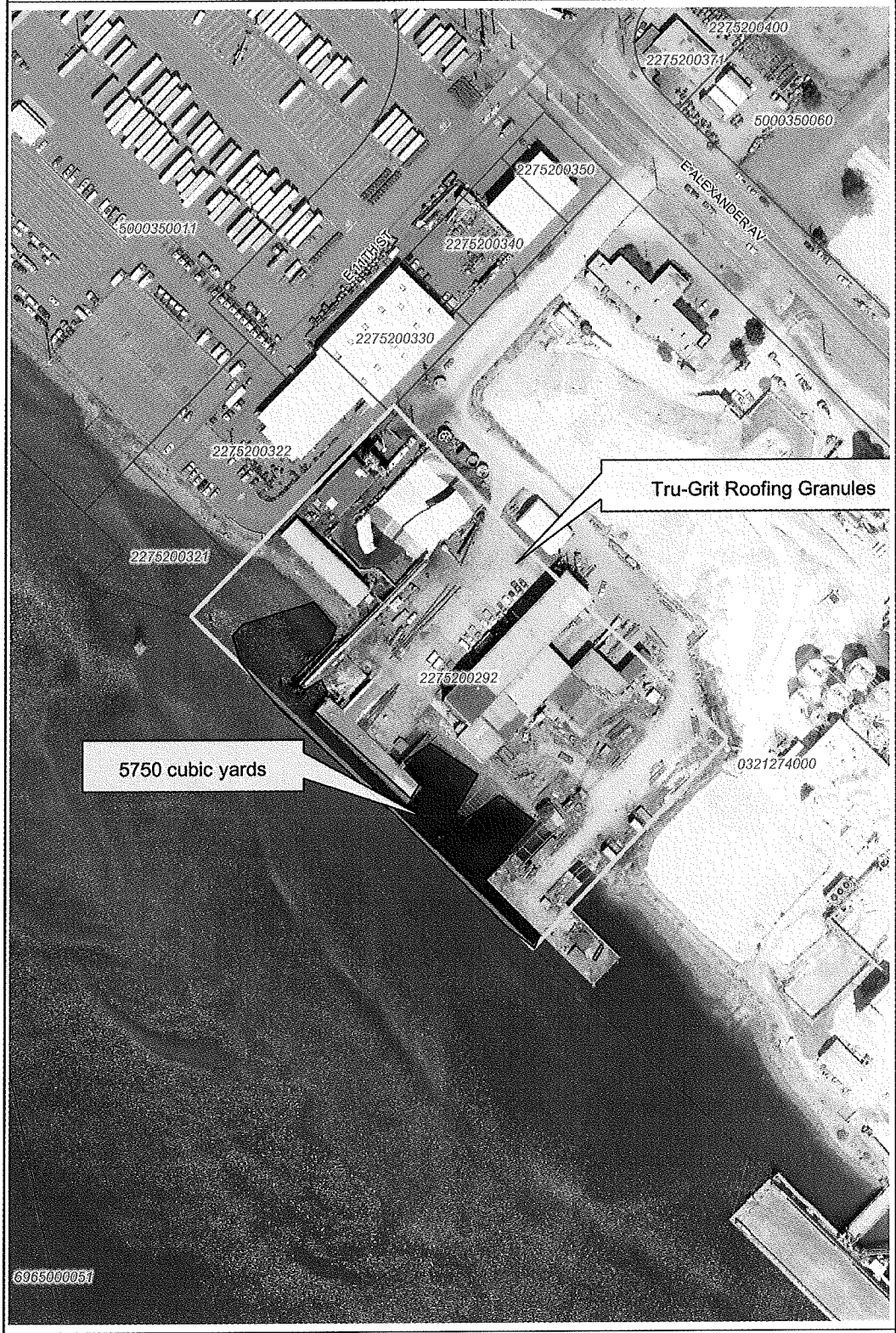
_____Almost into the next higher bin.
_____Right in the middle, unlikely to ever change.
_____Almost into the next lower bin.

True Grit Roofing Granules
Irrigation Via Groundwater 2 mile Radius

Person	Purpose	Ir Acres	TRS	QQ/Q	Src's	1stSrc
BUNGE A R	IR,DS	15	20.0N 03.0E 02	SW/SW	1	WELL
KAWASAKI G	IR	28	20.0N 03.0E 02	NW/SE	1	WELL
North Shore Associates Inc	IR	75	21.0N 03.0E 23	SW/NW	1	WELL
	Total:	**118**				

True Grit Roofing Granules

Potentially Contaminated Sediment



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The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. Orthophotos and other data may not align. The County assumes no liability for variations ascertained by actual survey. All data is expressly provided AS IS and WITH ALL FAULTS. The County makes no warranty of fitness for a particular purpose.

Tacoma | Pierce County Health Department
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TPCHD-SHA

Map Legend

- Highlighted Tax Parcels
- Tax Parcels
- Roads
- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Local Access
- County - 2008 - Ortho

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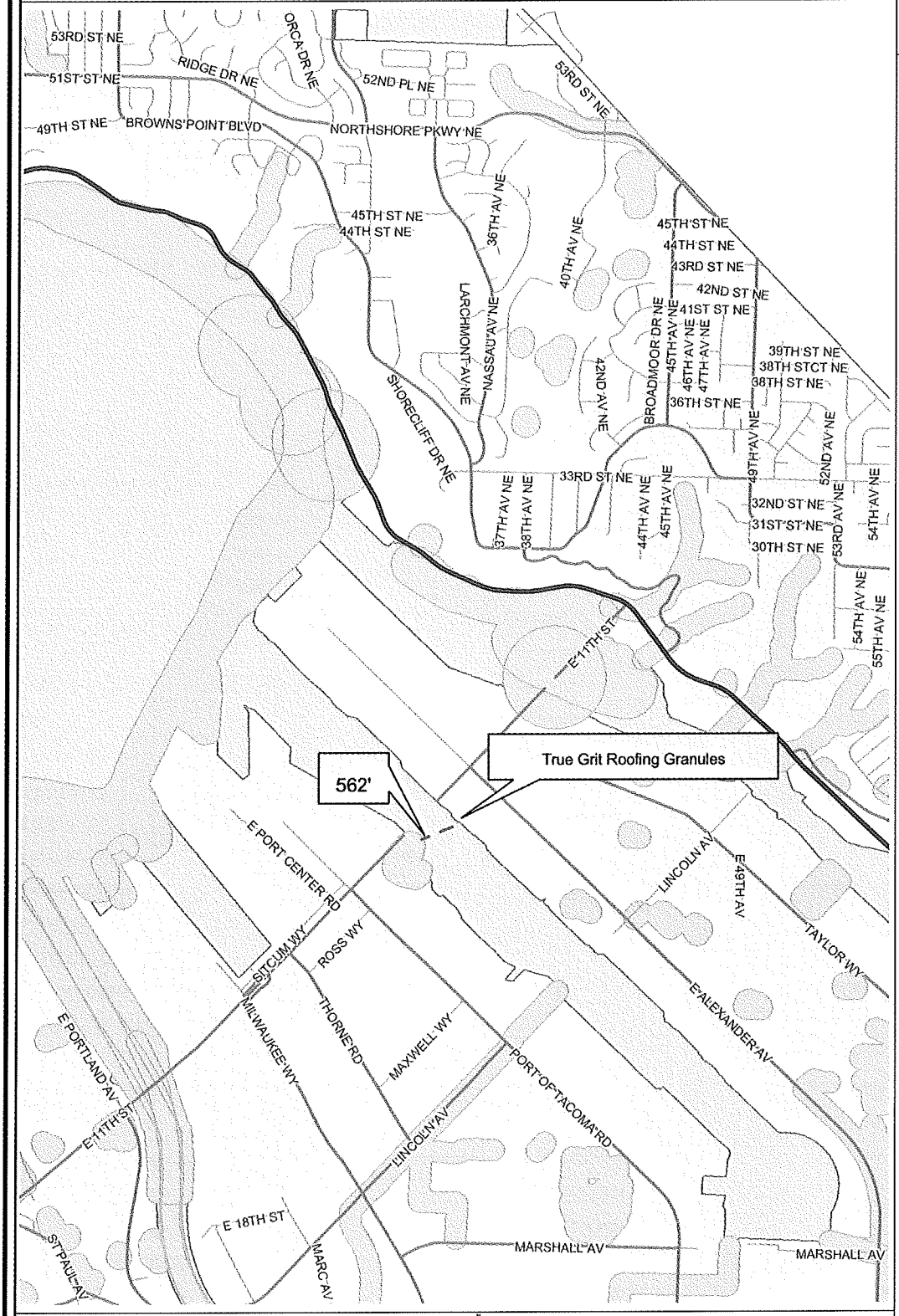
True Grit Roofing Granules

Nearest Sensitive Environment



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TPCHD-SHA

Map Legend

Roads

- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Local Access
- Potential F+W Habitat Conservation Areas

Pierce County Basemap

- Unincorporated County
- Tacoma
- Lakewood, Edgewood, Bonney Lake, Buckley, South Prairie
- Steilacoom, Fircrest, Fife, Gig Harbor, Orting, Eatonville, Roy, Carbonado, Wilkeson, Mt Rainier
- University Place, Puyallup, Auburn
- DuPont, Milton, Sumner
- Fort Lewis, McChord, McNeil Island
- Water

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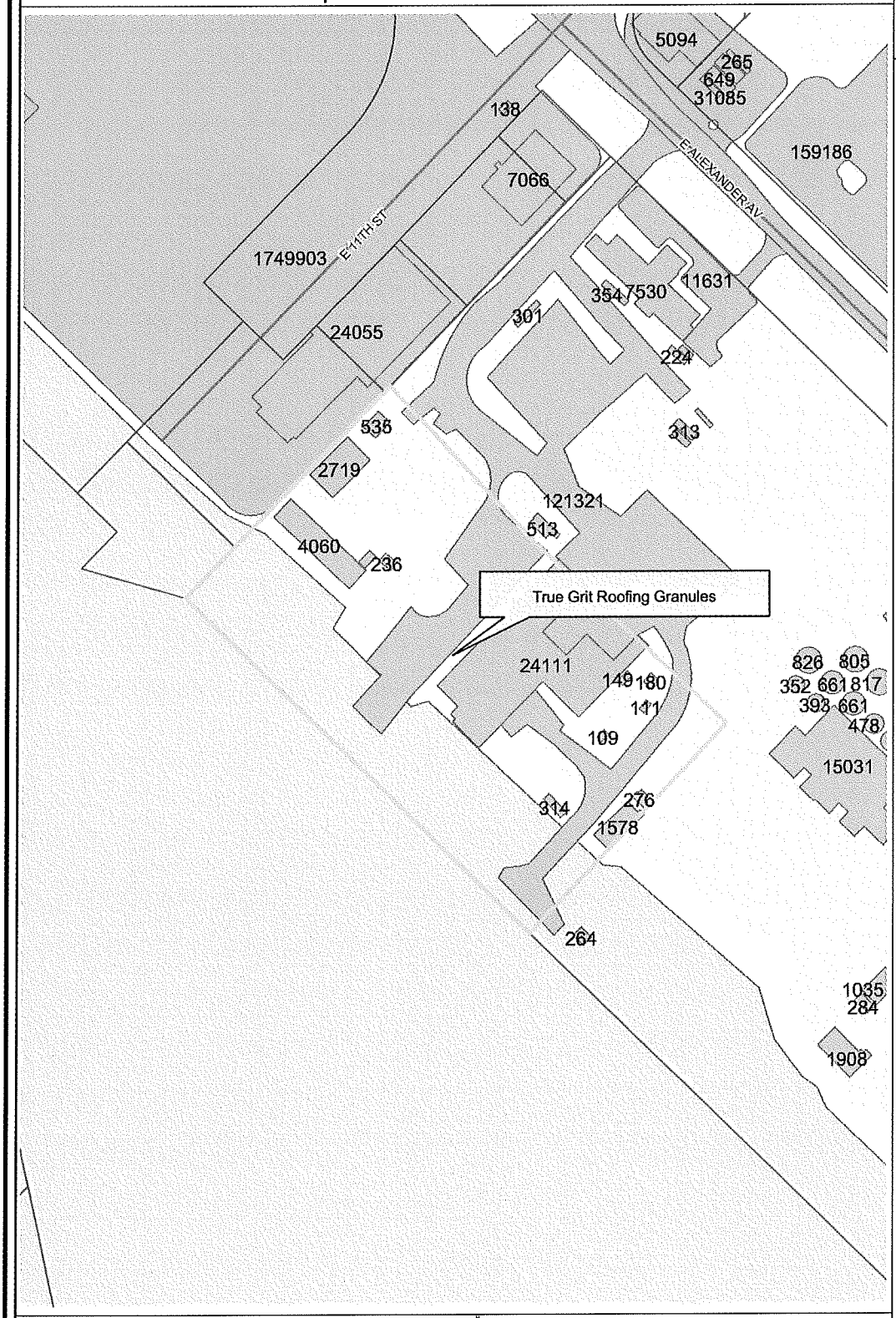
True Grit Roofing Granules

Impermeable Surface Cover



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TPCHD-SHA

Map Legend

- Highlighted Tax Parcels
- Tax Parcels
- Roads
- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Local Access
- Planimetrics - 2008
- Pierce County Basemap
- Unincorporated County
- Tacoma
- Lakewood, Edgewood, Bonney Lake, Buckley, South Prairie
- Steilacoom, Fircrest, Fife, Gig Harbor, Orting, Eatonville, Roy, Carbonado, Wilkeson, Mt Rainier
- University Place, Puyallup, Auburn
- DuPont, Milton, Sumner
- Fort Lewis, McChord, McNeil Island
- Water

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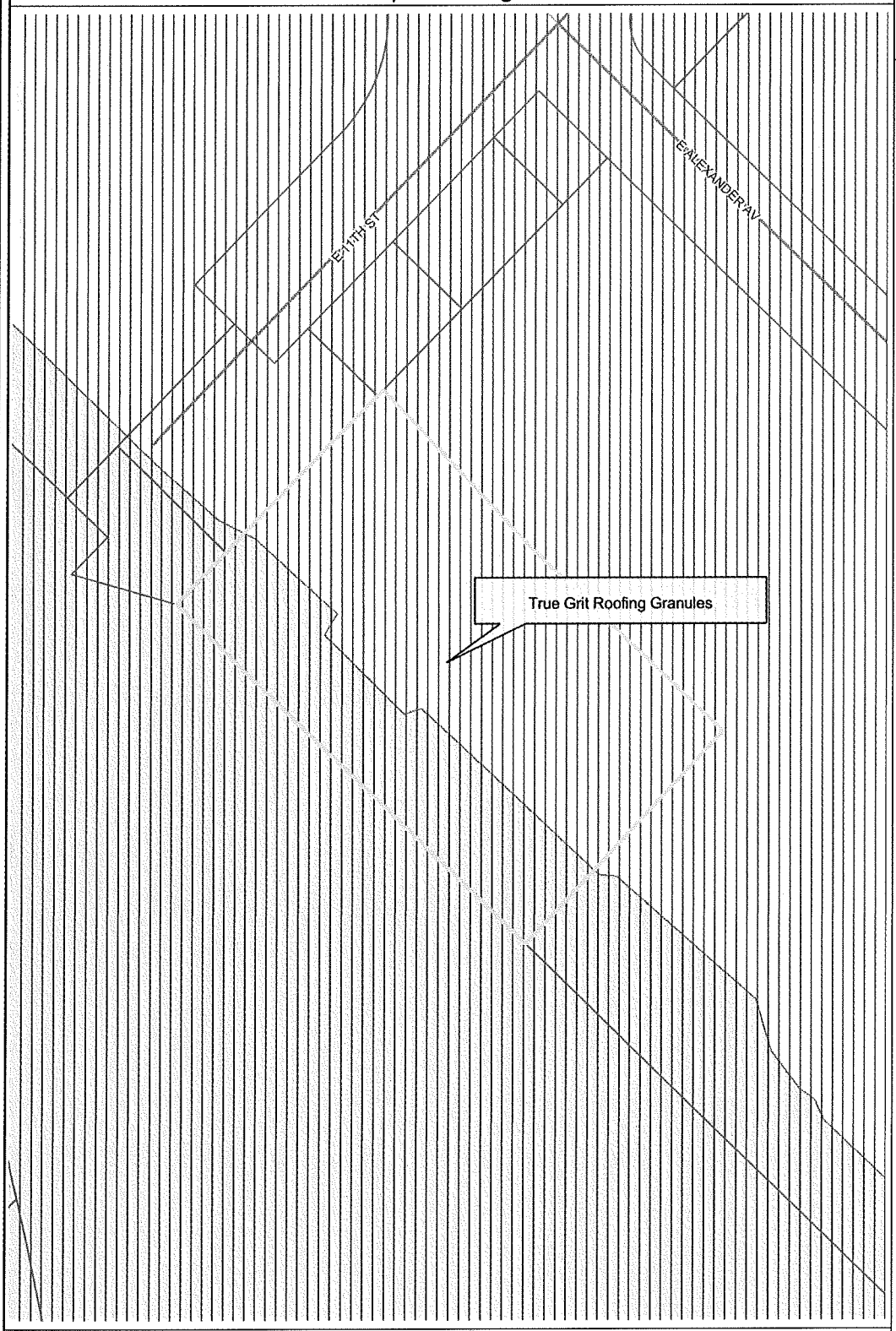
True Grit Roofing Granules

Aquifer Usage



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Tacoma | Pierce County Health Department
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TPCHD-SHA

Map Legend

- Highlighted Tax Parcels
- Tax Parcels
- Roads
- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Local Access
- Aquifer - Vulnerable Deep Aquifer Areas
- Not vulnerable
- Vulnerable
- Aquifer - Recharge Areas
- Aquifer - EPA Sole Source Aquifer
- Aquifer - Clover/Chambers Creek Aquifer

Pierce County Basemap

- Unincorporated County
- Tacoma
- Lakewood, Edgewood, Bonney Lake, Buckley, South Prairie
- Steilacoom, Fircrest, Fife, Gig Harbor, Orting, Eatonville, Roy, Carbonado, Wilkeson, Mt Rainier
- University Place, Puyallup, Auburn
- DuPont, Milton, Sumner
- Fort Lewis, McChord, McNeil Island
- Water

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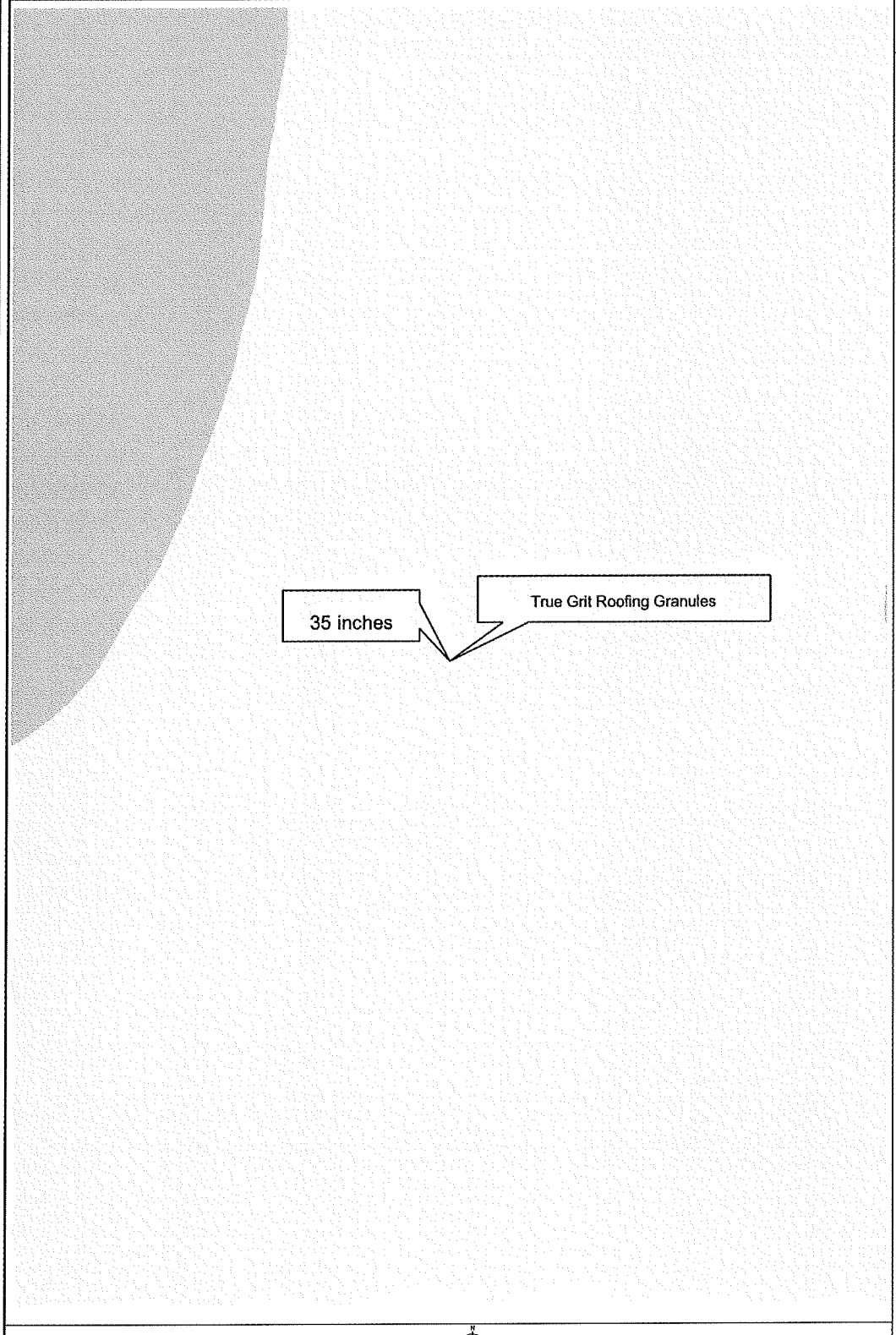
True Grit Roofing Granules

Average Annual Precip



0 3 mi.

Scale 1:190,549

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Tacoma | Pierce County Health Department
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TPCHD-SHA

Map Legend

Precipitation-Inches/Year

- 6 - 25
- 26 - 40
- 41 - 70
- 71 - 100
- 101 - 130
- 131 - 240

Pierce County Basemap

- Unincorporated County
- Tacoma
- Lakewood, Edgewood, Bonney Lake, Buckley, South Prairie
- Steilacoom, Fircrest, Fife, Gig Harbor, Orting, Eatonville, Roy, Carbonado, Wilkeson, Mt Rainier
- University Place, Puyallup, Auburn
- DuPont, Milton, Sumner
- Fort Lewis, McChord, McNeil Island
- Water

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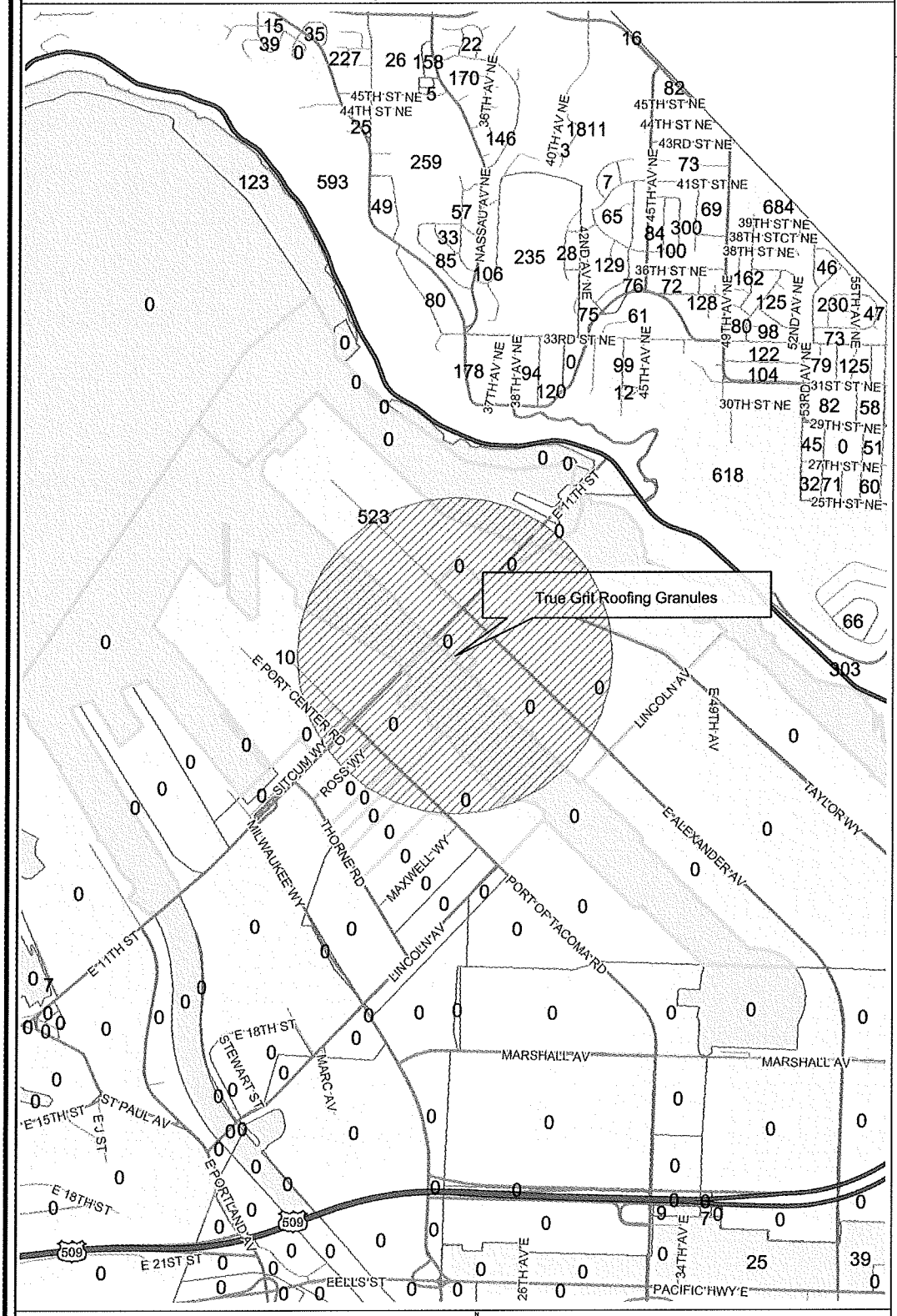
True Grit Roofing Granules

Population; 1/2 Mile



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TPCHD-SHA

Map Legend

Roads

- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Local Access

- Highlighted 2000 - Blocks
- 2000 - Blocks
- Highlighted 2000 - Block Groups
- Highlighted 2000 - Tracts

Pierce County Basemap

- Unincorporated County
- Tacoma
- Lakewood, Edgewood, Bonney Lake, Buckley, South Prairie
- Steilacoom, Fircrest, Fife, Gig Harbor, Orting, Eatonville, Roy, Carbonado, Wilkeson, Mt Rainier
- University Place, Puyallup, Auburn
- DuPont, Milton, Sumner
- Fort Lewis, McChord, McNeil Island
- Water

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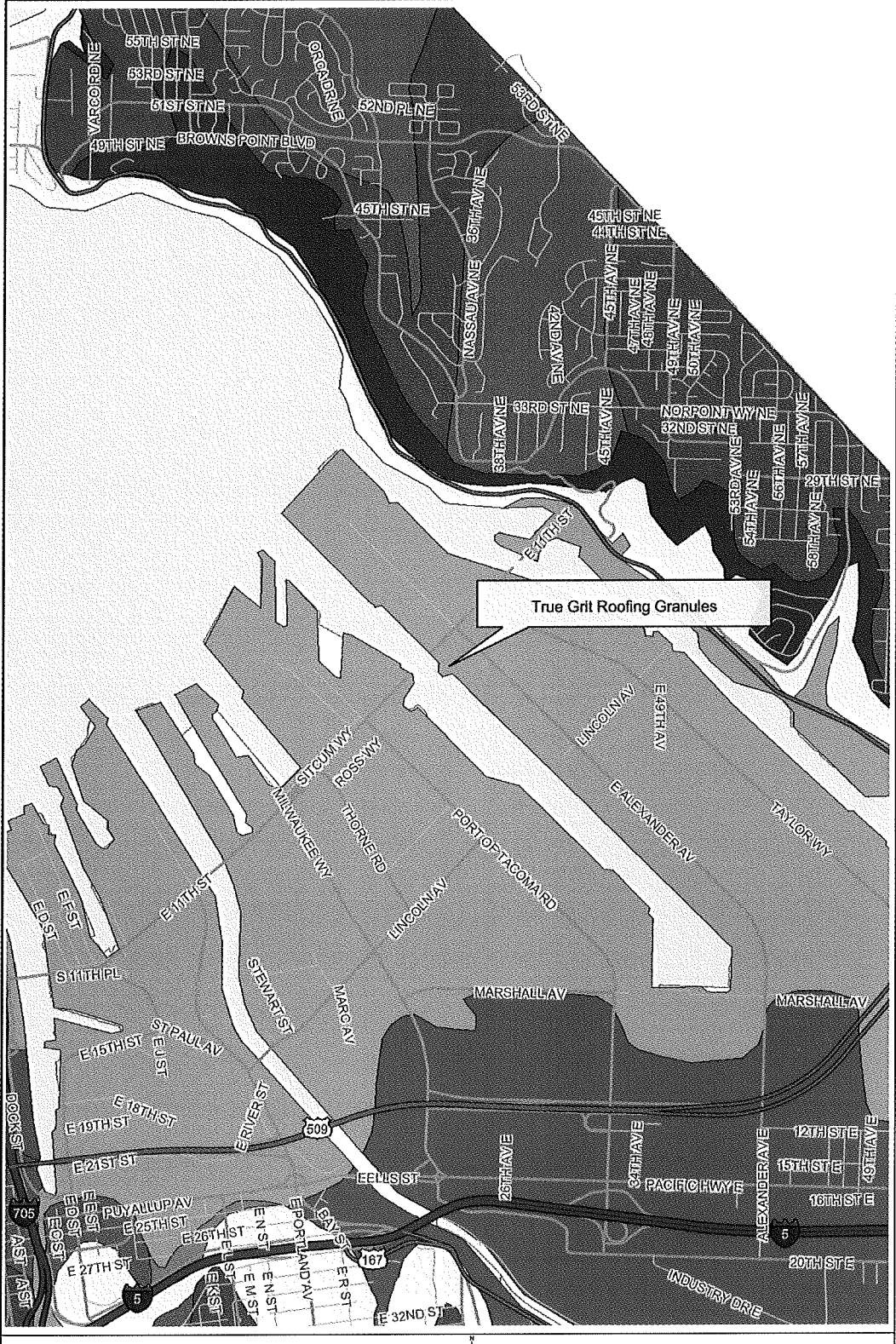
True Grit Roofing Granules

Geology / Soils



0 3250 ft.

Scale 1:38,110

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TPCHD-SHA

Map Legend

Roads

- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Local Access

Geology

- Alluvium
- Alpine glacial drift
- Artificial
- Ice
- Intrusive
- Lahars
- Mass wasting
- Peat deposits
- preFraser glacial - Possession/Doubleбluff drift
- preFraser nonglacial - Olympia gravel/Whidbey fm
- Sedimentary
- Vashon advance outwash
- Vashon recessional lacustrine
- Vashon recessional outwash
- Vashon till
- Volcanic

Pierce County Basemap

- Unincorporated County
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- University Place, Puyallup, Auburn
- DuPont, Milton, Sumner
- Fort Lewis, McChord, McNeil Island
- Water

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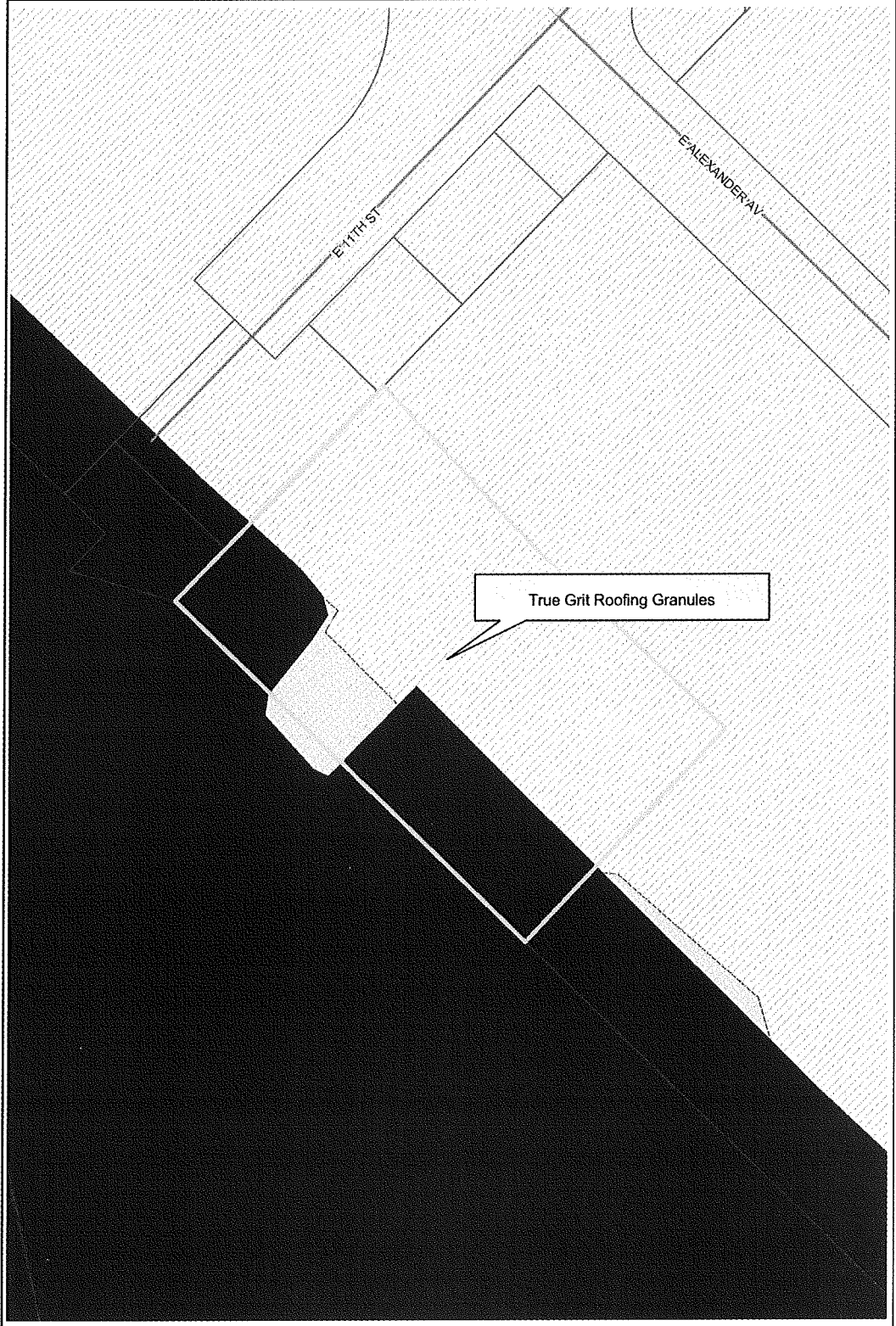
True Grit Roofing Granules

100 Year Flood Plain (FEMA)



0 190 ft.

Scale 1:2,297

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TPCHD-SHA

Map Legend

- Highlighted Tax Parcels
- Tax Parcels
- Roads
  - Interstate
  - Limited Access State Routes
  - Other State Routes
  - Ramps
  - Major Arterial
  - Collector
  - Local Access
- Flood Hazard Areas (FEMA)
  - 100 year(A Zone)
  - 500 year(X500 Zone)
- Firm Panel Area (FEMA)
- Pierce County Basemap
  - Unincorporated County
  - Tacoma
  - Lakewood, Edgewood, Bonney Lake, Buckley, South Prairie
  - Steilacoom, Fircrest, Fife, Gig Harbor, Orting, Eatonville, Roy, Carbonado, Wilkeson, Mt Rainier
  - University Place, Puyallup, Auburn
  - DuPont, Milton, Sumner
  - Fort Lewis, McChord, McNeil Island
  - Water

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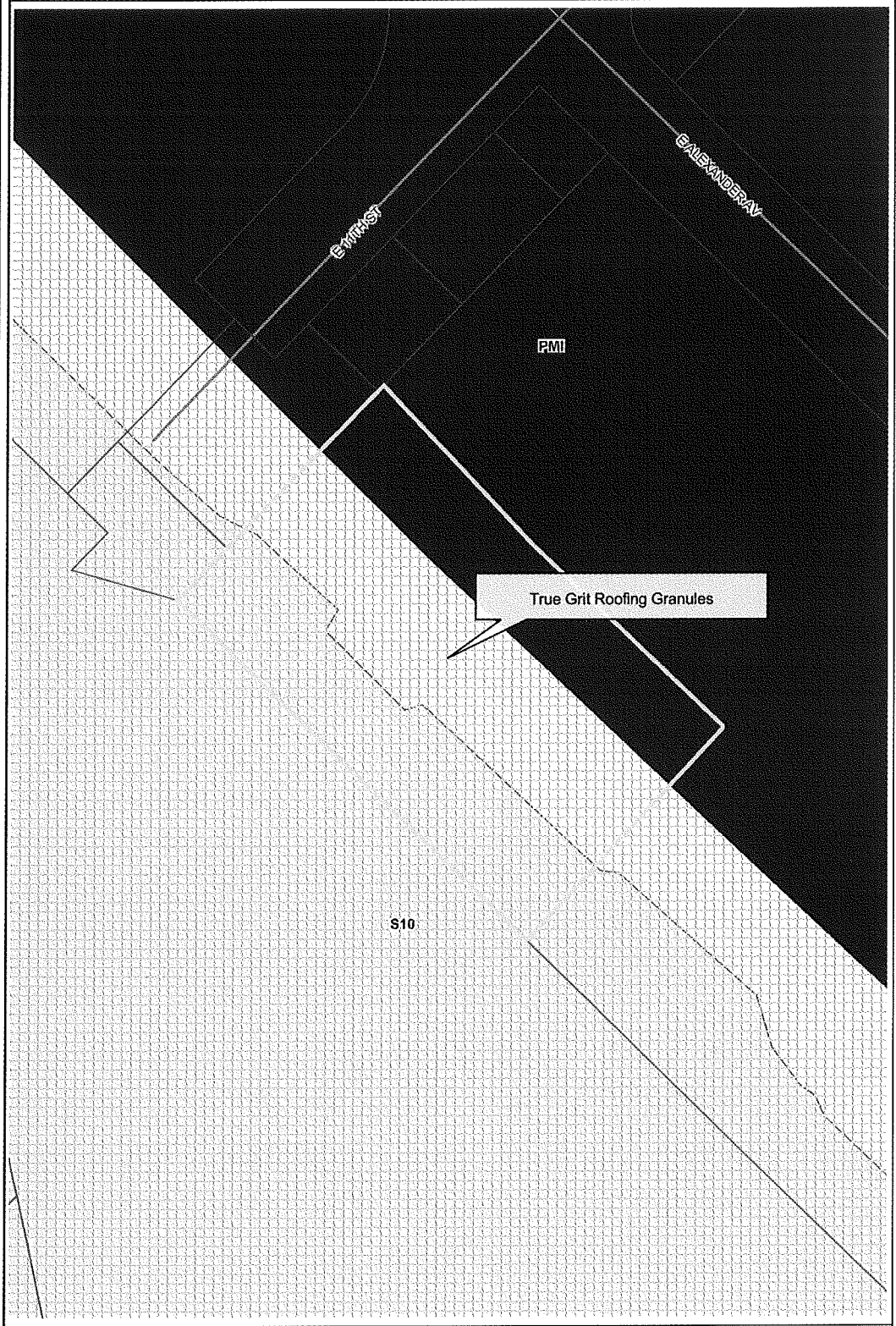
True Grit Roofing Granules

Zoning



0 190 ft.

Scale 1:2,297

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TPCHD-SHA

Map Legend

- Highlighted Tax Parcels
- Tax Parcels

Roads

- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Local Access

Zoning - Tacoma

Residential
- R1 : One Family Dwelling
- R2 : One Family Dwelling
- R2-SRD : One Family Dwelling - Special Review
- HMR-SRD : Historic Mixed Residential - Special Review
- R3 : Two Family Dwelling
- R4L : Low Density Multiple Family Dwelling
- R4 : Multiple Family Dwelling
- R5 : Multiple Family Dwelling

Commercial
- T : Transitional
- C1 : Commercial
- HM : Hospital/Medical
- PDB : Planned Business Development
- C2 : Commercial

Mixed-Use Center
- NRX : Neighborhood Residential Mixed-Use
- URX : Urban Residential Mixed-Use
- RCX : Residential Commercial Mixed-Use
- NCX : Neighborhood Commercial Mixed-Use
- CCX : Community Commercial Mixed-Use
- UCX and UCX-TD : Urban Center Mixed-Use
- HMX : Hospital-Medical Mixed-Use
- CIX : Commercial Industrial Mixed-Use

Downtown
- DR : Downtown Residential
- DMU : Downtown Mixed-Use
- WR : Warehouse/Residential
- DCC : Downtown Commercial Core

Industrial
- M1 : Light Industrial
- M2 : Heavy Industrial
- PMI : Port Maritime and Industrial

Shoreline
- S1 - S14 : Combined Shoreline

Zoning - Tacoma (Overlay 2)
- HIST : Historical
- ST-M/IC : South Tacoma Manufacturing / Industrial Center
- STGPD : South Tacoma Groundwater Protection
- VSD : View Sensitive

Zoning - Tacoma (Overlay 1)
- CONS : Conservation
- HIST : Historical
- PRD : Planned Residential Development
- ST-M/IC : South Tacoma Manufacturing / Industrial

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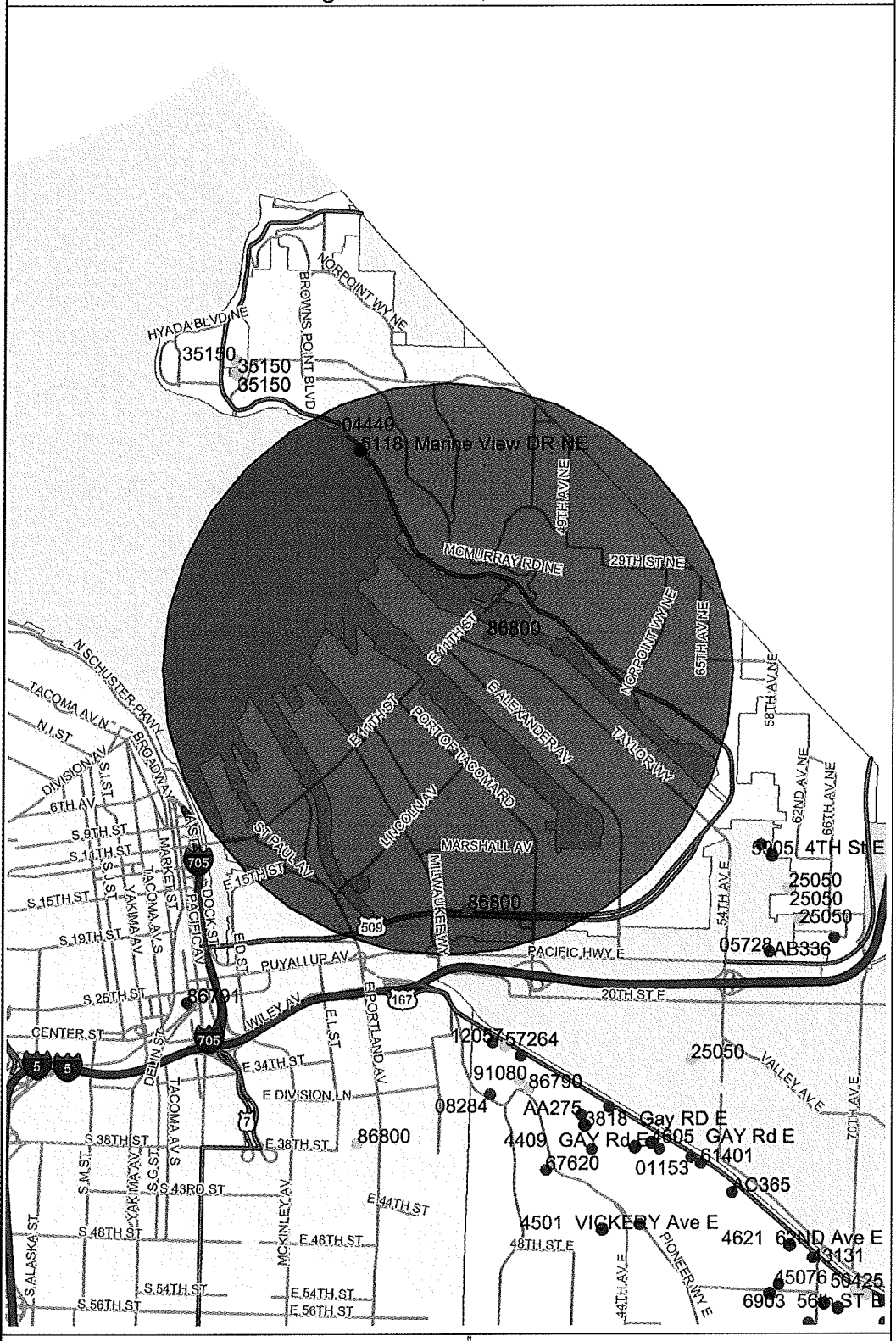
True Grit Roofing Granules

Drinking Water Wells, 2 Mile Radius



0 5500 ft.

Scale 1:68,598

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Map Legend

- Individual Wells
- Group A Wells
- Group B Water Systems

Roads

- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector

Pierce County Basemap

- Unincorporated County
- Tacoma
- Lakewood, Edgewood, Bonney Lake, Buckley, South Prairie
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- Fort Lewis, McChord, McNeil Island
- Water

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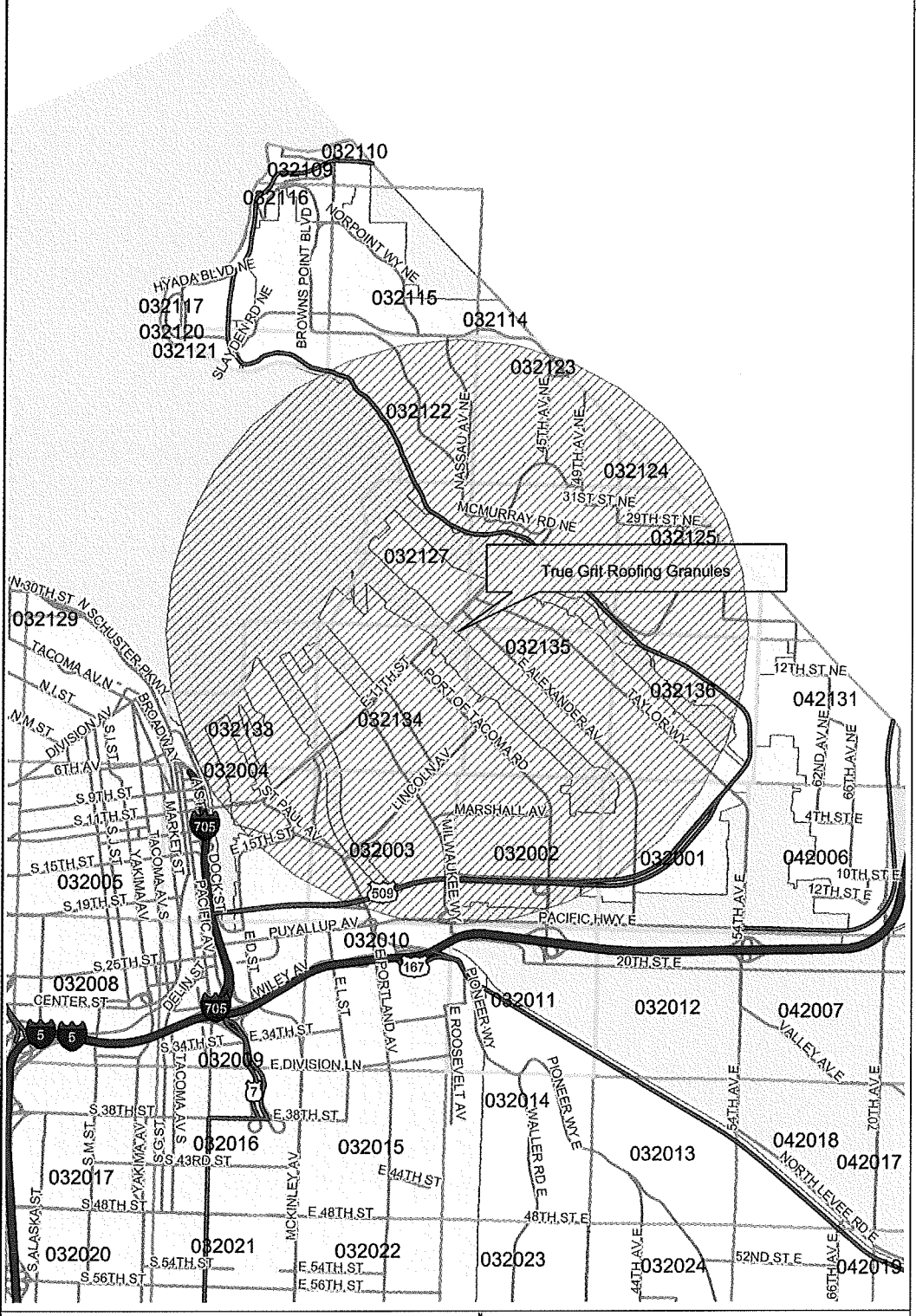
True Grit Roofing Granules

RTS, 2 Mile Radius



0 5500 ft.

Scale 1:68,598

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TPCHD-SHA

Map Legend

Roads

- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Highlighted RTS
- RTS

Pierce County Basemap

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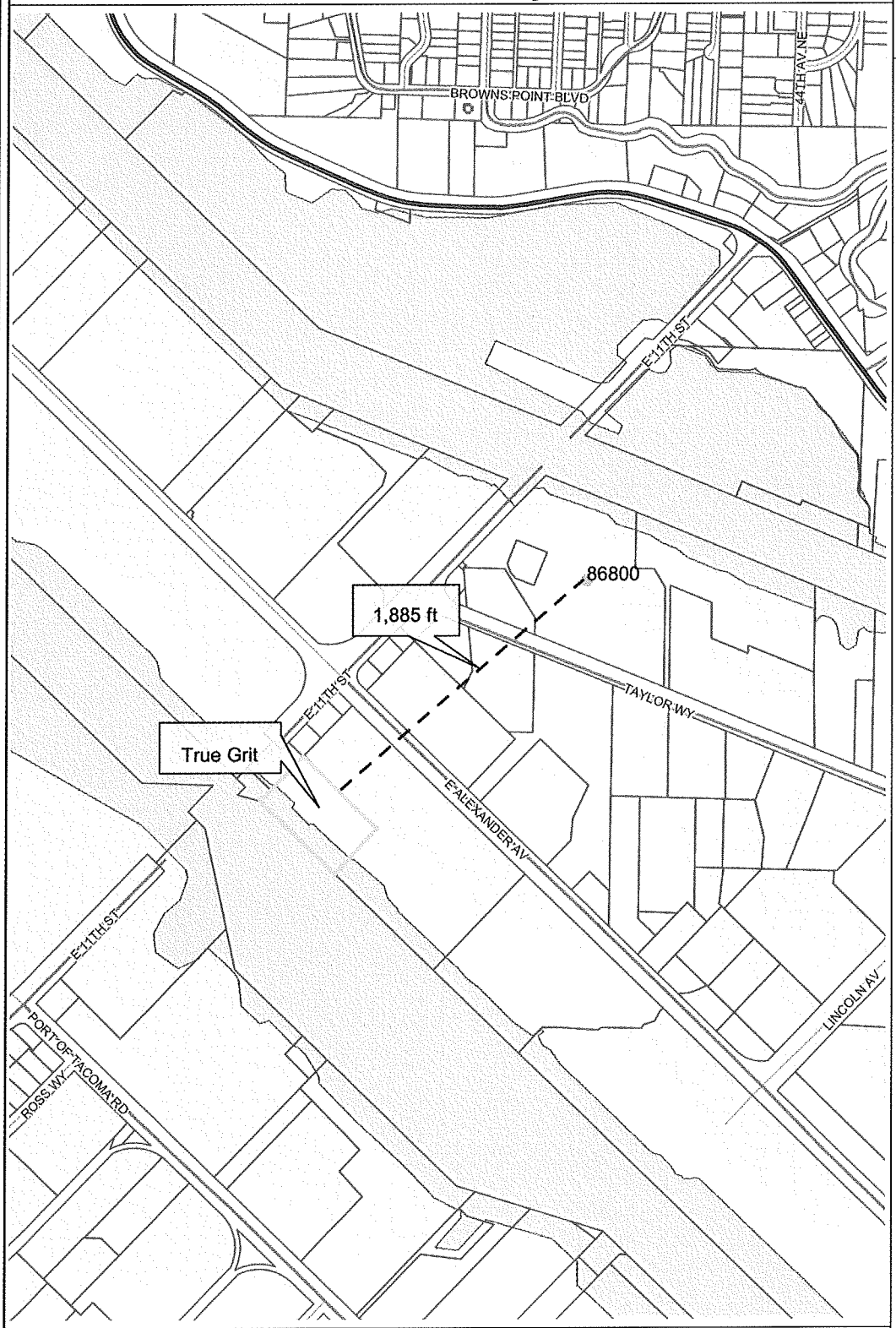
True Grit Roofing Granules

Distance to Nearest Drinking Water Well



0 900 ft.

Scale 1:10,713

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Map Legend

- Individual Wells
- Group A Wells
- Group B Water Systems
- Highlighted Tax Parcels
- Tax Parcels
- Roads
- Interstate
- Limited Access State Routes
- Other State Routes
- Ramps
- Major Arterial
- Collector
- Local Access
- Pierce County Basemap
- Unincorporated County
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- University Place, Puyallup, Auburn
- DuPont, Milton, Sumner
- Fort Lewis, McChord, McNeil Island
- Water

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