

*Draft*

# Environmental Impact Statement for the Next NGA West Campus in the Greater St. Louis Metropolitan Area

Appendices

Prepared for  
**National Geospatial-Intelligence Agency**



October 2015

**Appendix 4.6A**  
**Solid Waste Calculation Spreadsheets**

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Item	Site	Acreage				Waste Stream in Cubic Yards											Recyclable RR Rail (tons)	Roundtrip Truck Sorties Required			Roundtrip Miles to Landfill
		Total	C&D	Clear & Grub	MSW	C & D							Clear & Grub	MSW	Total CYs	(assume 15 CY capacity)		(assume 17 ton capacity)*	Total Required		
						Total	Wood	Brick	Concrete	Metal	Paper Board	Bituminous Asphaltic Concrete								Asphaltic Concrete	
1.0	Fenton (MO)	167.00	159.43	1.00	1.67	2,062.67	268.15	1,381.99	330.03	61.88	20.63	-	513,040.00	61.82	2,694.27	517,858.75	-	34,530.00	-	34,530.00	1,243,080.00
2.0	Mehlville (MO)	100.00	39.21	38.54	1.00	111,925.93	14,600.00	14,600.00	37,960.00	2,190.00	3,650.00	38,925.93	-	2,384.44	1,613.33	154,849.62	-	10,330.00	-	10,330.00	433,860.00
3.0	St. Louis City (MO)	100.00	14.33	13.50	1.00	69,355.56	9,016.22	46,468.22	11,096.89	2,080.67	693.56	21,788.07	-	836.03	1,613.33	93,592.98	-	6,240.00	-	6,240.00	87,360.00
4.0	St. Clair County (IL)	178.00	-	40.76	1.78	-	-	-	-	-	-	-	-	2,519.85	2,871.73	5,391.58	-	360.00	-	360.00	14,400.00

**Note:**

SF/acre 43,560

\* - 34,000 lbs or 17 tons

Site: Fenton (MO)

Acreage				Waste Stream in Cubic Yards										Recyclable	Roundtrip Truck Sorties Required			Roundtrip Miles to Landfill	
Total	C&D	Clear & Grub	MSW	C&D								Clear & Grub	MSW	Total CYs	RR Rail (tons)	(assume 15 CY capacity)	(assume 17 ton capacity)*		Total Required
				Total	Wood	Brick	Concrete	Metal	Paper Board	Bituminous Asphalt Concrete	Asphaltic Concrete					(assume 15 CY capacity)	(assume 17 ton capacity)*		
167.00	159.43	1.00	1.67	2,062.67	268.15	1,381.99	330.03	61.88	20.63	-	513,040.00	61.82	2,694.27	517,858.75	-	34,530.00	-	34,530.00	1,243,080

**Note:**

SF per Acre 43,560

\* - 34,000 lbs or 17 tons

Site: Fenton (MO)

Bldg Type	Approx. # of Bldgs	Approx. SF/story	# of Stories	Total Demo SF	CF of Debris/SF	CF of Debris	CU of Debris	CU Waste Composition							
								Wood	Brick	Concrete	Metal	Paper Board			
Residential															
One-story	6	3,094	1	18,564	3	55,692	2,063	268	1,382	330	62	21			
Two-story	-	-	2	-	-	-	-	-	-	-	-	-			
Three-Story	-	-	3	-	-	-	-	-	-	-	-	-			
Commercial/Industrial		Approximate Total SF													
One-story	-	-	1	-	-	-	-	-	-	-	-	-			
Two-story	-	-	2	-	3	-	-	-	-	-	-	-			
Three-Story	-	-	3	-	-	-	-	-	-	-	-	-			
<b>Totals:</b>	<b>6</b>			<b>18,564</b>		<b>55,692</b>	<b>2,063</b>	<b>268</b>	<b>1,382</b>	<b>330</b>	<b>62</b>	<b>21</b>			

Material Type	Approximate Total SF	Depth of Removal (ft)	CF of Debris	CU of Debris
Asphalt	-	1	-	-
Concrete	6,926,040	2	13,852,080	513,040
<b>Total:</b>	6,926,040		13,852,080	513,040

2,063

Revised Area	JG Acreage Est.	Team Acreage Est.
Overall site:	162	167
Concrete Removal:	154	159
Vegetative Area:	8	8

Table 4-1. Waste Generation Rates per Building Type

Building Type	CF of Debris/SF
Wood	4.5
Brick	3.0
Concrete	3.0

Total
1
1
1

Table 4-2. Waste Composition per Building Type

Building Type	% Wood	% Brick	% Concrete	% Metal	% Paper Board
Wood	60-75	17-22	10-30	2.5-3	<1
Brick	12-32	53-82	12-20	3	1-2
Concrete	18-20	20-22	50-51	3	5-7

Waste Composition Inputs Used

Building Type	% Wood	% Brick	% Concrete	% Metal	% Paper Board
Wood	70%	16%	11%	2%	1%
Brick	13%	67%	16%	3%	1%
Concrete	20%	20%	52%	3%	5%

Site: Fenton (MO)

**REFERENCE**

*COMPANY: Engineer's Estimate for Quantity Only of Tree Clearing at SWMU 3 (Site 7) Landfill*

*PROJECT NAME/NUMBER - Landfill Cap Completion at SWMU 3 (Site 7) / PN 457891*

*SERVICE - Tree Clearing (Includes cutting trees to 2 foot above ground, but no stump removal)*

*CONTRACT - SBRAC II Contract N62470-12-D-7004*

*LOCATION - Naval Activity - Ceiba, Puerto Rico*

Item	Area Trees	Density (#/acre)	Unit	Acres*	Quantity	Cu Ft Per Item	Total CF	Total CY	lbs/cf	Total	
										lbs	tons
1	Clearing (Trees)	21.00	Tree	1.00	21.00	44.16	927.28	34.34	42.00	38,945.81	19.47
2	Grubbing (stumps with root balls)	21.00	Stump	1.00	21.00	35.33	741.83	27.48	42.00	31,156.65	15.58
							<b>1,669.11</b>	<b>61.82</b>		<b>70,102.46</b>	<b>35.05</b>

**Notes:**

1 - Line Item 1 = There are an estimated 21 trees per acre (assume each tree is ~8 inches [in] diameter [dia.] and ~25 feet [ft.] in height) that need to be cut, cleared, and staged on site.

2 - Line Item 2 = There are an estimated 21 tree stumps per acre (each tree is ~1.5. dia. and ~5 ft. in length).

**\* - It is estimated that only 1 acre of the 8 acres requires clearing and grubbing. Estimated 7 acres is manicured landscape.**

Revised Area	JG Acreage Est.	Team Acreage Est.
Overall site:	162	167
Concrete Removal:	154	159
Vegetative Area:	8	8

Site: Fenton (MO)

Recyclable	Linear Ft (single rail)	Linear Ft (rail set [2])	# of rail sets	Linear Ft (# of rail sets)	Linear Yd	lb/yd*	Lbs of Rail	Tons of Rail
<u>Rail Road Rails</u>								
Google 1.30	1,801	3,602	2	7,204	2,401	130	312,173	156
Google 1.31	917	1,834	4	7,336	2,445	130	317,893	159
Google 1.32	1,034	2,068	4	8,272	2,757	130	358,453	179
Google 1.33	1,141	2,282	4	9,128	3,043	130	395,547	198
Google 1.34	1,219	2,438	2	4,876	1,625	130	211,293	106
Google 1.35	623	1,246	1	1,246	415	130	53,993	27
Google 1.36	331	662	1	662	221	130	28,687	14
Google 1.37	271	542	1	542	181	130	23,487	12
			<b>Totals:</b>	<b>39,266</b>	<b>13,089</b>		<b>1,701,527</b>	<b>-</b>

**Notes:**

\* - 130 lb/yd per American Railway Engineering Association (AREA)

Site: Mehlville (MO)

Acreage				Waste Stream in Cubic Yards									Roundtrip Truck Sorties Required (assume 15 CY capacity)	Roundtrip Miles to Landfill	
Total	C&D	Clear & Grub	MSW	C&D						Clear & Grub	MSW	Total CYs			
				Total	Wood	Brick	Concrete	Metal	Paper Board						Bituminous Asphalt Concrete
100.00	39.21	38.54	1.00	111,925.93	14,600.00	14,600.00	37,960.00	2,190.00	3,650.00	38,925.93	2,384.44	1,613.33	154,849.62	10,330.00	433,860

**Note:**

SF per Acre      43,560



Site: Mehlville (MO)

Bldg Type	Approx. # of Bldgs	Approx. SF/story	# of Stories	Total Demo SF	CF of Debris/SF	CF of Debris	CU of Debris	CU Waste Composition				
								Wood	Brick	Concrete	Metal	Paper Board
<b>Residential</b>												
One-story	-	-	1	-	-	-	-	-	-	-	-	-
Two-story	-	-	2	-	-	-	-	-	-	-	-	-
Three-Story	-	-	3	-	-	-	-	-	-	-	-	-
<b>Commercial/Industrial</b>												
One-story	-	-	1	-	-	-	-	-	-	-	-	-
Two-story	8	-	2	-	3	-	-	-	-	-	-	-
Three-Story	-	219,000	3	657,000	3	1,971,000	73,000	14,600	14,600	37,960	2,190	3,650
Totals:	8			657,000		1,971,000	73,000	14,600	14,600	37,960	2,190	3,650

Material Type	Approximate Total SF	Depth of Removal (ft)	CF of Debris	CU of Debris
Asphalt	1,051,000	1	1,051,000	38,926

Table 4-1. Waste Generation Rates per Building Type

Building Type	CF of Debris/SF
Wood	4.5
Brick	3.0
<b>Concrete</b>	<b>3.0</b>

Total
1
1
1

Table 4-2. Waste Composition per Building Type

Building Type	% Wood	% Brick	% Concrete	% Metal	% Paper Board
Wood	60-75	17-22	10-30	2.5-3	<1
Brick	12-32	53-82	12-20	3	1-2
<b>Concrete</b>	<b>18-20</b>	<b>20-22</b>	<b>50-51</b>	<b>3</b>	<b>5-7</b>

Waste Composition Inputs Used

Building Type	% Wood	% Brick	% Concrete	% Metal	% Paper Board
Wood	70%	16%	11%	2%	1%
Brick	13%	67%	16%	3%	1%
<b>Concrete</b>	<b>20%</b>	<b>20%</b>	<b>52%</b>	<b>3%</b>	<b>5%</b>

Site: Mehlville (MO)

**REFERENCE**

*COMPANY: Engineer's Estimate for Quantity Only of Tree Clearing at SWMU 3 (Site 7) Landfill*

*PROJECT NAME/NUMBER - Landfill Cap Completion at SWMU 3 (Site 7) / PN 457891*

*SERVICE - Tree Clearing (Includes cutting trees to 2 foot above ground, but no stump removal)*

*CONTRACT - SBRAC II Contract N62470-12-D-7004*

*LOCATION - Naval Activity - Ceiba, Puerto Rico*

Item	Area	Density (#/acre)	Unit	Acres	Quantity	Cu Ft Per Item	Total CF	Total CY	lbs/cf	Total	
										lbs	tons
1	Clearing (Trees)	21.00	Tree	38.54	810.00	44.16	35,766.56	1,324.69	42.00	1,502,195.63	751.10
2	Grubbing (stumps with root balls)	21.00	Stump	38.54	810.00	35.33	28,613.25	1,059.75	42.00	1,201,756.50	600.88
							<b>64,379.81</b>	<b>2,384.44</b>		<b>2,703,952.13</b>	<b>1,351.98</b>

Notes:

1 - Line Item 1 = There are an estimated 21 trees per acre (assume each tree is ~8 inches [in] diameter [dia.] and ~25 feet [ft.] in height) that need to be cut, cleared, and staged on site.

2 - Line Item 2 = There are an estimated 21 tree stumps per acre (each tree is ~1.5. dia. and ~5 ft. in length).

Site: St. Louis City (MO)

Acreage				Waste Stream in Cubic Yards										Roundtrip Truck Sorties Required (assume 15 CY capacity)	Roundtrip Miles to Landfill
Total	C&D	Clear & Grub	MSW	C&D						Clear & Grub	MSW	Total CYs			
				Total	Wood	Brick	Concrete	Metal	Paper Board				Bituminous Asphalt Concrete		
100.00	14.33	13.50	1.00	69,355.56	9,016.22	46,468.22	11,096.89	2,080.67	693.56	21,788.07	836.03	1,613.33	93,592.98	6,240.00	87,360

**Note:**

SF per Acre      43,560

Site: St. Clair City (IL)

Bldg. Type	Approx. # of Bldgs.	Approx. SF/story	# of Stories	Total Demo SF	CF of Debris/SF	CF of Debris	CU of Debris	CU Waste Composition				
								Wood	Brick	Concrete	Metal	Paper Board
<b>Residential</b>												
One-story	24	1,000	1	24,000	3	72,000	2,667	347	1,787	427	80	27
Two-story	46	1,000	2	92,000	3	276,000	10,222	1,329	6,849	1,636	307	102
Three-Story	14	1,000	3	42,000	3	126,000	4,667	607	3,127	747	140	47
<b>Commercial/Industrial</b>												
One-story	6	34,000	1	34,000	3	102,000	3,778	491	2,531	604	113	38
Two-story	4	137,800	2	275,600	3	826,800	30,622	3,981	20,517	4,900	919	306
Three-Story	4	52,200	3	156,600	3	469,800	17,400	2,262	11,658	2,784	522	174
Totals:	<b>98</b>			<b>624,200</b>		<b>1,872,600</b>	<b>69,356</b>	<b>9,016</b>	<b>46,468</b>	<b>11,097</b>	<b>2,081</b>	<b>694</b>

Table 4-1. Waste Generation Rates per Building Type

Building Type	CF of Debris/SF
Wood	4.5
<b>Brick</b>	<b>3.0</b>
Concrete	3.0

Total
1
1
1

Table 4-2. Waste Composition per Building Type

Building Type	% Wood	% Brick	% Concrete	% Metal	% Paper Board
Wood	60-75	17-22	10-30	2.5-3	<1
<b>Brick</b>	<b>12-32</b>	<b>53-82</b>	<b>12-20</b>	<b>3</b>	<b>1-2</b>
Concrete	18-20	20-22	50-51	3	5-7

Waste Composition Inputs Used

Building Type	% Wood	% Brick	% Concrete	% Metal	% Paper Board
Wood	70%	16%	11%	2%	1%
<b>Brick</b>	<b>13%</b>	<b>67%</b>	<b>16%</b>	<b>3%</b>	<b>1%</b>
Concrete	20%	20%	52%	3%	5%

Site: NorthSide (MO)

**REFERENCE**

*COMPANY: Engineer's Estimate for Quantity Only of Tree Clearing at SWMU 3 (Site 7) Landfill*

*PROJECT NAME/NUMBER - Landfill Cap Completion at SWMU 3 (Site 7) / PN 457891*

*SERVICE - Tree Clearing (Includes cutting trees to 2 foot above ground, but no stump removal)*

*CONTRACT - SBRAC II Contract N62470-12-D-7004*

*LOCATION - Naval Activity - Ceiba, Puerto Rico*

Item	Area	Density (#/acre)	Unit	Acres	Quantity	Cu Ft Per Item	Total CF	Total CY	lbs/cf	Total	
										lbs	tons
1	Clearing (Trees)	21.00	Tree	13.50	284.00	44.16	12,540.38	464.46	42.00	526,695.75	263.35
2	Grubbing (stumps with root balls)	21.00	Stump	13.50	284.00	35.33	10,032.30	371.57	42.00	421,356.60	210.68
							<b>22,572.68</b>	<b>836.03</b>		<b>948,052.35</b>	<b>474.03</b>

**Notes:**

1 - Line Item 1 = There are an estimated 21 trees per acre (assume each tree is ~8 inches [in] diameter [dia.] and ~25 feet [ft.] in height) that need to be cut, cleared, and staged on site.

2 - Line Item 2 = There are an estimated 21 tree stumps per acre (each tree is ~1.5. dia. and ~5 ft. in length).

Site: St. Louis City (MO)

Item	Approx. Acres	Approx. SF	CF of Debris*	CU of Debris	
Rd-01	10.20	444,312	222,156	8,228	
Rd-02	0.65	28,314	14,157	524	
Rd-03	1.95	84,942	42,471	1,573	
Rd-04	0.79	34,412	17,206	637	
Rd-05	2.45	106,722	53,361	1,976	
Rd-06	0.74	32,234	16,117	597	
Rd-07	1.66	72,310	36,155	1,339	
Rd-08	2.10	91,476	45,738	1,694	
Rd-09	2.10	91,476	45,738	1,694	
Rd-10	1.44	62,726	31,363	1,162	
Rd-11	1.34	58,370	29,185	1,081	
Rd-12	1.59	69,260	34,630	1,283	
<del>Rd-13</del>	<del>1.80</del>	<del>78,408</del>	<del>39,204</del>	<del>1,452</del>	Removed
Totals:	<b>27.01</b>	<b>1,176,556</b>	<b>588,278</b>	<b>21,788</b>	

\* - Assume 0.5 ft depth

Site: St. Clair City (IL)

Acreage				Waste Stream in Cubic Yards									Roundtrip Truck Sorties Required (assume 15 CY capacity)	Roundtrip Miles to Landfill	
Total	C&D	Clear & Grub	MSW	C&D						Clear & Grub	MSW	Total CYs			
				Total	Wood	Brick	Concrete	Metal	Paper Board						
178.00	-	40.76	1.78	-	-	-	-	-	-	-	2,519.85	2,871.73	5,391.58	360.00	14,400

**Note:**

SF per Acre      43,560

Site: St. Clair City (IL)

**REFERENCE**

*COMPANY: Engineer's Estimate for Quantity Only of Tree Clearing at SWMU 3 (Site 7) Landfill*

*PROJECT NAME/NUMBER - Landfill Cap Completion at SWMU 3 (Site 7) / PN 457891*

*SERVICE - Tree Clearing (Includes cutting trees to 2 foot above ground, but no stump removal)*

*CONTRACT - SBRAC II Contract N62470-12-D-7004*

*LOCATION - Naval Activity - Ceiba, Puerto Rico*

Item	Area	Density (#/acre)	Unit	Acres	Quantity	Cu Ft Per Item	Total CF	Total CY	lbs/cf	Total	
										lbs	tons
1	Clearing (Trees)	21.00	Tree	40.76	856.00	44.16	37,797.75	1,399.92	42.00	1,587,505.50	793.75
2	Grubbing (stumps with root balls)	21.00	Stump	40.76	856.00	35.33	30,238.20	1,119.93	42.00	1,270,004.40	635.00
							<b>68,035.95</b>	<b>2,519.85</b>		<b>2,857,509.90</b>	<b>1,428.75</b>

**Notes:**

1 - Line Item 1 = There are an estimated 21 trees per acre (assume each tree is ~8 inches [in] diameter [dia.] and ~25 feet [ft.] in height) that need to be cut, cleared, and staged on site.

2 - Line Item 2 = There are an estimated 21 tree stumps per acre (each tree is ~1.5. dia. and ~5 ft. in length).



One-way Distances (mi)					
Site	1.0 Fenton (MO) 1050 Dodge Drive Fenton, MO 63026	2.0 Mehlville (MO) 13045 Tesson Ferry Road St. Louis, MO 63128	3.0 NorthSide (MO) 2300 Cass Avenue St. Louis, MO 63106	4.0 St. Clair City (IL) Wherry Road O'Fallon, IL 62269	Comment
<b>Landfill</b>					
<b>Rock Hill Demolition Landfill</b> 1233 North Rock Hill Road St Louis, MO 63124 (314) 968-2336	9	13	10	32	Not recommended based on POC phone conversation (see below table "Landfill Information")
<b>Veolia Es Oak Ridge Landfill</b> 1741 Sulphur Spring Road Ballwin, MO 63021 (636) 225-7220	6	12	22	43	Shortest haul distance 06Apr15 - CLOSED SITE - NO LONGER RECEIVING WASTE
<b>Champ Landfill</b> Riverport Drive Maryland Heights, MO 63043 (636) 321-2100	18	22	20	40	Shortest haul distance
<b>Cottonwood Hills Landfill</b> 10400 Hillstown Road Marissa, IL 62257 (618) 295-2809	50	46	41	30	Acceptable LF but distance is too great from all sites
<b>North Milam Landfill</b> 601 Madison Road East Saint Louis, IL 62201 (618) 271-6788	23	21	7	20	Shortest haul distance, least traffic, and likely lower tipping fee

Site Addresses	
1.0 Fenton (MO)	1050 Dodge Drive, Fenton, MO 63026
2.0 Mehlville (MO)	13045 Tesson Ferry Road, St. Louis, MO 63128
3.0 NorthSide (MO)	2300 Cass Avenue, St. Louis, MO 63106
4.0 St. Clair City (IL)	Wherry Road, O'Fallon, IL 62269

LF Addresses	
<b>Rock Hill Demolition Landfill</b>	1233 North Rock Hill Rd, St Louis, MO 63124
<b>Veolia Es Oak Ridge Landfill</b>	1741 Sulphur Spring Road, Ballwin, MO 63021
<b>Champ Landfill</b>	Riverport Drive, Maryland Heights, MO 63043
<b>Cottonwood Hills Landfill</b>	10400 Hillstown Road, Marissa, IL 62257
<b>North Milam Landfill</b>	601 Madison Road, East Saint Louis, IL 62201

Landfill Information						
Landfill	Permitted Tons per Day	Estimated Annual Waste Received (CY)	Remaining Capacity (CY)	Estimated Closure Date	POC	Comment
<b>Rock Hill Demolition Landfill</b> 1233 North Rock Hill Road St Louis, MO 63124 (314) 968-2336	Owner would not disclose and data not shown on MO DNER website			2025	Bruce Dresser (314) 968-2336	Left VMs on 06 & 07Apr15. 08Apr15 spoke to Bruce Dresser who only would provided an estimated closure date and referenced all other inquires to MO DNER website. Stated LF limited to concrete (minor rebar) and minor metal. LF representative was not willing to discuss waste types received with out a Phase 1 ESA and how much waste is anticipated.
<b>Champ Landfill</b> Riverport Drive Maryland Heights, MO 63043 (636) 321-2100	No Regulatory Limit	1,500,000 (2014)	85,000,000	2087	Mitch Stepro LF Representative (314) 575-1302 (Owned by Progressive Waste Solutions)	Mitch indicated the LF disposes of C&D and MSW waste. They do not perform recycling at the site but noted there are many in the St. Louis area. The landfill does compost on site.
<b>Cottonwood Hills Landfill</b> 10400 Hillstown Road Marissa, IL 62257 (618) 295-2809	No Regulatory Limit	1,499,122 (2013)	84,653,700	2070	Jackie Rosko LF Representative (314) 568-2451 (Owned by Waste Mgt)	WM accepts the following Non-Hazardous Materials: Asbestos-Friable, Asbestos-Non-Friable, Auto Shredder Fluff, Biosolids, CERCLA Waste, C&D Debris, Drum Management-Liquids, Drum Management-Solids, E&P Wastes, Industrial & Special Waste, Liquifix (Solidification Services), Municipal Solid Waste, NORM (Naturally Occurring Radioactive Material) and Yard Waste (from www.WM.com accessed 08Apr15 and <a href="http://www.epa.illinois.gov/topics/waste-management/landfills/landfill-capacity/2013/index">http://www.epa.illinois.gov/topics/waste-management/landfills/landfill-capacity/2013/index</a> ).
<b>North Milam Landfill</b> 601 Madison Road East Saint Louis, IL 62201 (618) 271-6788	No Regulatory Limit	121,710 (2013)	44,300,700	2039	Jackie Rosko LF Representative (314) 568-2451 (Owned by Waste Mgt)	WM accepts the following Non-Hazardous Materials: Asbestos-Friable, Asbestos-Non-Friable, Auto Shredder Fluff, Biosolids, C&D Debris, Drum Management-Liquids, Drum Management-Solids, E&P Wastes, Industrial & Special Waste, Liquifix (Solidification Services), Municipal Solid Waste and NORM (Naturally Occurring Radioactive Material) (from www.WM.com accessed 08Apr15 and <a href="http://www.epa.illinois.gov/topics/waste-management/landfills/landfill-capacity/2013/index">http://www.epa.illinois.gov/topics/waste-management/landfills/landfill-capacity/2013/index</a> ).

**Reference: UFC 1-900-01 (01Dec02) - Selection of Method for the Reduction, Reuse, and Recycling of Demolition Waste**

**Table 4-1. Waste Generation Rates per Building Type**

Building Type	CF of Debris/SF
Wood	4.5
Brick	3.0
Concrete	3.0

**Table 4-2. Waste Composition per Building Type**

Building Type	% Wood	% Brick	% Concrete	% Metal	% Paper Board
Wood	60-75	17-22	10-30	2.5-3	<1
Brick	12-32	53-82	12-20	3	1-2
Concrete	18-20	20-22	50-51	3	5-7