200 White Mountain Drive
New Bremen, OH 45869
Tel: (419) 977-2766
Fax: (419) 977-2767

Date: 8/4/2022
Client Name: Tucson Country Club
File Number: 34998
Consultant: Soil and Water Consulting

Greensmix : Lab #1490 WCS&G PHX STRAIGHT S
Gravel: Lab #1675 WCS&G PHX

GREENSMIX/GRAVEL COMPATIBILITY

Rootzone Sieve Analysis	Particle Diameter (%)							
	2.0 mm	1.0 mm	0.5 mm	0.25 mm	0.15 mm	0.106 mm	0.053 mm	Silt/Clay
% Retained	0.0	7.3	39.6	38.8	10.6	1.7	0.5	1.5

Gravel Sieve Analysis	Particle Diameter (%)							
	12.5 mm	9.5 mm	6.35 mm	4.75 mm	2.36 mm	2.0 mm	1.0 mm	< 1.0 mm
% Retained	0.0	0.8	34.8	30.2	33.8	0.1	0.1	0.2

1. **For Bridging to Occur.** D15(gravel) <= 8 x D85(rootzone)

   D15(gravel) = 3.39
   D85(rootzone) = 0.90

   3.39 mm <= 7.20 mm

   These Results show that the D15(gravel) at 3.39mm **IS** less than or equal to (<=) 8 x D85(rootzone), which was 8 x 0.90mm = 7.20mm. Therefore, bridging of the coarsest 15% rootzone particles **SHOULD** occur with the finest 15% of gravel particles. This gravel **IS** compatable with sand.

2. **For Adequate Permeability.** D15(gravel) >= 5 x D15(rootzone)

   D15(gravel) = 3.39
   D15(rootzone) = 0.25

   3.39 mm >= 1.25 mm

   These Results show that the D15(gravel) at 3.39mm **IS** >= 5 x D15(rootzone), which was 5 x 0.25mm = 1.25mm. Therefore, adequate permeability **SHOULD** occur with this gravel and rootzone sand.

3. **Uniformity Coefficient of Gravel** D90(gravel)/D15(gravel) <= 3.0

   D90(gravel) = 8.67
   D15(gravel) = 3.39

   2.56 mm <= 3.00mm

   These Results show that the D90(gravel)/D15(gravel) is 2.56mm which **IS** less than or equal to 3.0. Therefore, the Uniformity Coefficient of gravel **PASSES** this criterion.

Furthermore, the gravel should have 100% particles < 12mm, <= 10% particles < 2mm, and <= 5% particles < 1mm.

Reviewed by: _____

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Date: 8/4/2022
Client Name: Tucson Country Club
File Number: 34998
Consultant: Soil and Water Consulting

Greensmix : Lab #1491 WCS&G PHX 90/10
Gravel: Lab #1675 WCS&G PHX

GREENSMIX/GRAVEL COMPATIBILITY

Rootzone Sieve Analysis	Particle Diameter (%)							
	2.0 mm	1.0 mm	0.5 mm	0.25 mm	0.15 mm	0.106 mm	0.053 mm	Silt/Clay
% Retained	0.1	6.6	36.4	40.6	10.3	2.4	0.8	2.8

Gravel Sieve Analysis	Particle Diameter (%)							
	12.5 mm	9.5 mm	6.35 mm	4.75 mm	2.36 mm	2.0 mm	1.0 mm	< 1.0 mm
% Retained	0.0	0.8	34.8	30.2	33.8	0.1	0.1	0.2

1. **For Bridging to Occur.** D15(gravel) <= 8 x D85(rootzone)

   D15(gravel) = 3.39
   D85(rootzone) = 0.89

   3.39 mm <= 7.12 mm

   These Results show that the D15(gravel) at 3.39mm **IS** less than or equal to (<=) 8 x D85(rootzone), which was 8 x 0.89mm = 7.12mm. Therefore, bridging of the coarsest 15% rootzone particles **SHOULD** occur with the finest 15% of gravel particles. This gravel **IS** compatable with sand.

2. **For Adequate Permeability.** D15(gravel) >= 5 x D15(rootzone)

   D15(gravel) = 3.39
   D15(rootzone) = 0.24

   3.39 mm >= 1.20 mm

   These Results show that the D15(gravel) at 3.39mm **IS** >= 5 x D15(rootzone), which was 5 x 0.24mm = 1.20mm. Therefore, adequate permeability **SHOULD** occur with this gravel and rootzone sand.

3. **Uniformity Coefficient of Gravel** D90(gravel)/D15(gravel) <= 3.0

   D90(gravel) = 8.67
   D15(gravel) = 3.39

   2.56 mm <= 3.00mm

   These Results show that the D90(gravel)/D15(gravel) is 2.56mm which **IS** less than or equal to 3.0. Therefore, the Uniformity Coefficient of gravel **PASSES** this criterion.

Furthermore, the gravel should have 100% particles < 12mm, <= 10% particles < 2mm, and <= 5% particles < 1mm.

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Date: 8/4/2022
Client Name: Tucson Country Club
File Number: 34998
Consultant: Soil and Water Consulting

Greensmix : Lab #1492 WCS&G PHX 80/20 SAND/DAK
Gravel: Lab #1675 WCS&G PHX

GREENSMIX/GRAVEL COMPATIBILITY

Rootzone Sieve Analysis	Particle Diameter (%)							
	2.0 mm	1.0 mm	0.5 mm	0.25 mm	0.15 mm	0.106 mm	0.053 mm	Silt/Clay
% Retained	1.1	8.3	37.6	37.0	8.6	2.3	0.5	4.6

Gravel Sieve Analysis	Particle Diameter (%)							
	12.5 mm	9.5 mm	6.35 mm	4.75 mm	2.36 mm	2.0 mm	1.0 mm	< 1.0 mm
% Retained	0.0	0.8	34.8	30.2	33.8	0.1	0.1	0.2

1. **For Bridging to Occur.** D15(gravel) <= 8 x D85(rootzone)

   D15(gravel) = 3.39
   D85(rootzone) = 0.93

   3.39 mm <= 7.44 mm

   These Results show that the D15(gravel) at 3.39mm **IS** less than or equal to (<=) 8 x D85(rootzone), which was 8 x 0.93mm = 7.44mm. Therefore, bridging of the coarsest 15% rootzone particles **SHOULD** occur with the finest 15% of gravel particles. This gravel **IS** compatable with sand.

2. **For Adequate Permeability.** D15(gravel) >= 5 x D15(rootzone)

   D15(gravel) = 3.39
   D15(rootzone) = 0.24

   3.39 mm >= 1.20 mm

   These Results show that the D15(gravel) at 3.39mm **IS** >= 5 x D15(rootzone), which was 5 x 0.24mm = 1.20mm. Therefore, adequate permeability **SHOULD** occur with this gravel and rootzone sand.

3. **Uniformity Coefficient of Gravel** D90(gravel)/D15(gravel) <= 3.0

   D90(gravel) = 8.67
   D15(gravel) = 3.39

   2.56 mm <= 3.00mm

   These Results show that the D90(gravel)/D15(gravel) is 2.56mm which **IS** less than or equal to 3.0. Therefore, the Uniformity Coefficient of gravel **PASSES** this criterion.

Furthermore, the gravel should have 100% particles < 12mm, <= 10% particles < 2mm, and <= 5% particles < 1mm.

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