

## Interim Riverine Forested Hydrogeomorphic Analysis Worksheet

**West Sycamore Road Expansion Project**

<b>Wetland Assessment Summary</b>				
	Acreage	Physical FCUs	Biological FCUs	Chemical FCUs
WAA 1	2.75	0.76	1.38	1.33
WAA 2	0.12	0.03	0.06	0.06
WAA 3	0.21	0.07	0.13	0.10
WAA 4	0.39	0.12	0.24	0.21
<b>Totals</b>	<b>3.47</b>	<b>0.98</b>	<b>1.81</b>	<b>1.70</b>
<b>Secondary Service Area</b>		<b>1.47</b>	<b>2.71</b>	<b>2.55</b>

## Interim Riverine Forested Hydrogeomorphic Analysis Worksheet

### WAA 1

9/22/2021

**Acreage = 2.75**

**WDP1C**

### Wetland Assessment Area

#### Pre-Project

Variable	Subindex	Notes:
$V_{dur}$	0.10	In an average year all or portions of the WAA either floods and/or ponds for at least 1-7 consecutive days
$V_{freq}$	0.25	Floods or ponds less than 2 out of 5 years (100-500 yr floodplain grey w/out elevations)
$V_{topo}$	0.40	Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features
$V_{cwd}$	0.30	Less than 3 pieces of cwd greater than 3" diameter along 100' transect
$V_{wood}$	0.75	67-90% of the WAA is covered with woody vegetation
$V_{tree}$	0.30	Less than 20% of the stand is oak, hickory, cypress, maple and/or elm
$V_{rich}$	0.40	One to two tree species present
$V_{basal}$	0.40	The average basal area of the WAA is less than 60 square ft/acre
$V_{density}$	0.60	The WAA averages a tree density of 250-500 trees/acre or 50-100 trees/acre
$V_{mid}$	0.50	Midstory coverage of the WAA is between 11-30%
$V_{herb}$	0.50	Herbaceous cover in the WAA averages between 31-50%
$V_{detritus}$	0.50	From 11-84% of the area possesses an O or A horizon
$V_{redox}$	1.00	Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive redoximorphic processes (many)
$V_{sorpt}$	1.00	The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, 3/1)
$V_{connect}$	1.00	Wetland plus four habitat types and/or surrounded by forested

#### Functional Capacity Index (FCI)

Temp. Storage of Water (1) 0.276

Maintain Plant & Animal Com. (2) 0.500

Removal of Elements (3) 0.483

#### Functional Capacity Units (FCU)

Calculated FCU (Temp Storage)	0.760	physical
Calculated FCU (Maintain Plan & Animal)	1.375	biological
Calculated FCU (Removal of Elements)	1.329	chemical

## Tree Calculations Data (WAA 1)

Tree DBH and Basal Area		
Tree DBH (in.)	Tree Basal Area (Sq.Ft.)	Species
7.94	0.344	<i>Triadica sebifera</i>
3.29	0.059	<i>Triadica sebifera</i>
4.55	0.113	<i>Triadica sebifera</i>
4.52	0.111	<i>Triadica sebifera</i>
4.31	0.101	<i>Triadica sebifera</i>
3.31	0.060	<i>Triadica sebifera</i>
4.23	0.098	<i>Triadica sebifera</i>
4.72	0.122	<i>Triadica sebifera</i>
3.43	0.064	<i>Triadica sebifera</i>
5.52	0.166	<i>Triadica sebifera</i>
5.63	0.173	<i>Triadica sebifera</i>
3.40	0.063	<i>Triadica sebifera</i>
4.93	0.133	<i>Triadica sebifera</i>
4.03	0.089	<i>Triadica sebifera</i>
3.79	0.078	<i>Triadica sebifera</i>
4.34	0.103	<i>Triadica sebifera</i>
4.45	0.108	<i>Triadica sebifera</i>
5.23	0.149	<i>Triadica sebifera</i>
4.05	0.089	<i>Triadica sebifera</i>
5.39	0.158	<i>Triadica sebifera</i>
4.04	0.089	<i>Triadica sebifera</i>
4.70	0.120	<i>Triadica sebifera</i>
3.66	0.073	<i>Triadica sebifera</i>
4.49	0.110	<i>Triadica sebifera</i>
5.46	0.163	<i>Triadica sebifera</i>
3.49	0.066	<i>Triadica sebifera</i>
3.88	0.082	<i>Triadica sebifera</i>
3.96	0.086	<i>Triadica sebifera</i>
6.03	0.198	<i>Triadica sebifera</i>
7.19	0.282	<i>Triadica sebifera</i>
<b>Total</b>		
137.96	3.650	

Average Basal Area (Sq.Ft. per acre)	
Plot Size (Sq.ft.)	4356
Sq.ft. per acre	43560
Total Basal Area (Sq.ft.)	3.650
Total BA per acre	36.505

0.10 (30 ft radius plot)

Number of Trees (per acre)	
Plot Size (Sq.ft.)	4356
Number of Trees	30
Total number of trees per acre	300

0.10 (30 ft radius plot)

## Interim Riverine Forested Hydrogeomorphic Analysis Worksheet

### WAA 2

9/22/2021

**Acreage = 0.12**

### WDP 2

#### **Wetland Assessment Area**

##### **Pre-Project**

<b>Variable</b>	<b>Subindex</b>	<b>Notes:</b>
$V_{dur}$	0.10	In an average year all or portions of the WAA either floods and/or ponds for at least 1-7 consecutive days
$V_{freq}$	0.25	Floods or ponds less than 2 out of 5 years (100-500 yr floodplain grey w/out elevations)
$V_{topo}$	0.40	Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features
$V_{ cwd}$	0.30	Less than 3 pieces of cwd greater than 3" diameter along 100' transect
$V_{wood}$	0.75	67-90% of the WAA is covered with woody vegetation
$V_{tree}$	0.30	Less than 20% of the stand is oak, hickory, cypress, maple and/or elm
$V_{rich}$	0.40	One to two tree species present
$V_{basal}$	0.40	The average basal area of the WAA is less than 60 square ft/acre
$V_{density}$	0.60	The WAA averages a tree density of 250-500 trees/acre or 50-100 trees/acre
$V_{mid}$	0.50	Midstory coverage of the WAA is between 11-30%
$V_{herb}$	0.30	Herbaceous cover in the WAA is less than 5% or greater than 50%
$V_{detritus}$	0.50	From 11-84% of the area possesses an O or A horizon
$V_{redox}$	1.00	Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive redoximorphic processes (many)
$V_{sorpt}$	1.00	The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, 3/1)
$V_{connect}$	1.00	Wetland plus four habitat types and/or surrounded by forested

#### **Functional Capacity Index (FCI)**

Temp. Storage 0.276  
of Water (1)

Maintain Plant 0.483  
& Animal Com. (2)

Removal of 0.483  
Elements (3)

#### **Functional Capacity Units (FCU)**

Calculated FCU (Temp Storage)	<span style="border: 1px solid black; padding: 2px;">0.033</span>	<i>physical</i>
Calculated FCU (Maintain Plan & Animal)	<span style="border: 1px solid black; padding: 2px;">0.058</span>	<i>biological</i>
Calculated FCU (Removal of Elements)	<span style="border: 1px solid black; padding: 2px;">0.058</span>	<i>chemical</i>

## Tree Calculations Data (WAA 2)

<b>Tree DBH and Basal Area</b>		
Tree DBH (in.)	Tree Basal Area (Sq.Ft.)	Species
9.33	0.475	<i>Triadica sebifera</i>
4.70	0.120	<i>Triadica sebifera</i>
5.74	0.180	<i>Triadica sebifera</i>
3.78	0.078	<i>Triadica sebifera</i>
5.59	0.170	<i>Triadica sebifera</i>
3.66	0.073	<i>Triadica sebifera</i>
7.79	0.331	<i>Triadica sebifera</i>
4.37	0.104	<i>Triadica sebifera</i>
5.14	0.144	<i>Triadica sebifera</i>
4.23	0.098	<i>Triadica sebifera</i>
4.31	0.101	<i>Triadica sebifera</i>
4.61	0.116	<i>Triadica sebifera</i>
6.29	0.216	<i>Triadica sebifera</i>
3.99	0.087	<i>Triadica sebifera</i>
3.02	0.050	<i>Triadica sebifera</i>
3.27	0.058	<i>Triadica sebifera</i>
4.28	0.100	<i>Triadica sebifera</i>
5.37	0.157	<i>Triadica sebifera</i>
4.31	0.101	<i>Triadica sebifera</i>
5.57	0.169	<i>Triadica sebifera</i>
5.04	0.139	<i>Triadica sebifera</i>
7.06	0.272	<i>Triadica sebifera</i>
4.17	0.095	<i>Triadica sebifera</i>
3.72	0.075	<i>Triadica sebifera</i>
4.04	0.089	<i>Triadica sebifera</i>
4.85	0.128	<i>Triadica sebifera</i>
5.22	0.149	<i>Triadica sebifera</i>
4.36	0.104	<i>Triadica sebifera</i>
4.04	0.089	<i>Triadica sebifera</i>
4.57	0.114	<i>Triadica sebifera</i>
5.10	0.142	<i>Triadica sebifera</i>
5.98	0.195	<i>Triadica sebifera</i>
5.40	0.159	<i>Triadica sebifera</i>
4.78	0.125	<i>Triadica sebifera</i>
4.74	0.123	<i>Triadica sebifera</i>
8.64	0.407	<i>Triadica sebifera</i>
<b>Total</b>		
181.06	5.332	

<b>Average Basal Area (Sq.Ft. per acre)</b>	
Plot Size (Sq.ft.)	4356
Sq.ft. per acre	43560
Total Basal Area (Sq.ft.)	5.332
Total BA per acre	53.322

0.10 (30 ft radius plot)

<b>Number of Trees (per acre)</b>	
Plot Size (Sq.ft.)	4356
Number of Trees	36
Total number of trees per acre	360

0.10 (30 ft radius plot)

## Interim Riverine Forested Hydrogeomorphic Analysis Worksheet

**WAA 3**

9/22/2021

**Acreage = 0.21**

**WDP 3**

### **Wetland Assessment Area**

#### **Pre-Project**

Variable	Subindex	Notes:
$V_{dur}$	0.10	In an average year all or portions of the WAA either floods and/or ponds for at least 1-7 consecutive days
$V_{freq}$	0.25	Floods or ponds less than 2 out of 5 years (100-500 yr floodplain grey w/out elevations)
$V_{topo}$	0.40	Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features
$V_{ cwd}$	1.00	More than 7 pieces of cwd greater than 3" diameter along 100' transect
$V_{wood}$	0.50	34-66% of the WAA is covered with woody vegetation
$V_{tree}$	0.30	Less than 20% of the stand is oak, hickory, cypress, maple and/or elm
$V_{rich}$	0.40	One to two tree species present
$V_{basal}$	0.40	The average basal area of the WAA is less than 60 square ft/acre
$V_{density}$	0.60	The WAA averages a tree density of 250-500 trees/acre or 50-100 trees/acre
$V_{mid}$	0.50	Midstory coverage of the WAA is between 11-30%
$V_{herb}$	0.30	Herbaceous cover in the WAA is less than 5% or greater than 50%
$V_{detritus}$	0.50	From 11-84% of the area possesses an O or A horizon
$V_{redox}$	1.00	Redox concentrations represent at least 20% of the pedon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive redoximorphic processes (many)
$V_{sorpt}$	1.00	The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, 3/1)
$V_{connect}$	1.00	Wetland plus four habitat types and/or surrounded by forested

#### **Functional Capacity Index (FCI)**

Temp. Storage of Water (1) 0.316

Maintain Plant & Animal Com. (2) 0.600

Removal of Elements (3) 0.463

#### **Functional Capacity Units (FCU)**

Calculated FCU (Temp Storage)	<span style="border: 1px solid black; padding: 2px;">0.066</span>	<i>physical</i>
Calculated FCU (Maintain Plan & Animal)	<span style="border: 1px solid black; padding: 2px;">0.126</span>	<i>biological</i>
Calculated FCU (Removal of Elements)	<span style="border: 1px solid black; padding: 2px;">0.097</span>	<i>chemical</i>

### Tree Calculations Data (WAA 3)

<b>Tree DBH and Basal Area</b>		<b>Species</b>
<b>Tree DBH (in.)</b>	<b>Tree Basal Area (Sq.Ft.)</b>	
7.74	0.327	<i>Triadica sebifera</i>
13.87	1.049	<i>Triadica sebifera</i>
7.90	0.340	<i>Triadica sebifera</i>
8.99	0.441	<i>Triadica sebifera</i>
5.86	0.187	<i>Triadica sebifera</i>
5.63	0.173	<i>Triadica sebifera</i>
5.25	0.150	<i>Triadica sebifera</i>
3.90	0.083	<i>Triadica sebifera</i>
3.06	0.051	<i>Triadica sebifera</i>
3.67	0.073	<i>Triadica sebifera</i>
<b>Total</b>		
65.87	2.875	

<b>Average Basal Area (Sq.Ft. per acre)</b>	
Plot Size (Sq.ft.)	4356
Sq.ft. per acre	43560
Total Basal Area (Sq.ft.)	2.875
Total BA per acre	28.751

<b>Number of Trees (per acre)</b>	
Plot Size (Sq.ft.)	4356
Number of Trees	10
Total number of trees per acre	100

## Interim Riverine Forested Hydrogeomorphic Analysis Worksheet

### WAA 4

9/22/2021

**Acreage = 0.39**

### WDP 4

#### **Wetland Assessment Area**

##### **Pre-Project**

<b>Variable</b>	<b>Subindex</b>	<b>Notes:</b>
$V_{dur}$	0.10	In an average year all or portions of the WAA either floods and/or ponds for at least 1-7 consecutive days
$V_{freq}$	0.25	Floods or ponds less than 2 out of 5 years (100-500 yr floodplain grey w/out elevations)
$V_{topo}$	0.40	Less than 15% of the WAA is represented by dips, hummocks, channel sloughs and/or other topographic features
$V_{cwd}$	0.30	Less than 3 pieces of cwd greater than 3" diameter along 100' transect
$V_{wood}$	1.00	Greater than 90% of the WAA is covered with woody vegetation
$V_{tree}$	0.30	Less than 20% of the stand is oak, hickory, cypress, maple and/or elm
$V_{rich}$	0.40	One to two tree species present
$V_{basal}$	1.00	The average basal area of the WAA is greater than 100 square ft/acre
$V_{density}$	1.00	The WAA averages a tree density of 100-250 trees/acre
$V_{mid}$	0.75	Midstory coverage of the WAA is between 31-50%
$V_{herb}$	0.50	Herbaceous cover in the WAA averages between 31-50%
$V_{detritus}$	0.50	From 11-84% of the area possesses an O or A horizon
$V_{redox}$	1.00	Redox concentrations represent at least 20% of the pecon within the top 4 inches of the soil surface, or feature masked due to parent material but conditions are conducive redoximorphic processes (many
$V_{sorpt}$	1.00	The WAA is dominated by montmorillonitic clayey soils (clay, clay loams, silty clay loams) or soils with high organic (2/1, 2/2, 3/1)
$V_{connect}$	1.00	Wetland plus four habitat types and/or surrounded by forested

#### **Functional Capacity Index (FCI)**

Temp. Storage 0.299  
of Water (1)

Maintain Plant 0.604  
& Animal Com. (2)

Removal of 0.550  
Elements (3)

#### **Functional Capacity Units (FCU)**

Calculated FCU (Temp Storage)	<span style="border: 1px solid black; padding: 2px;">0.117</span>	<i>physical</i>
Calculated FCU (Maintain Plan & Animal)	<span style="border: 1px solid black; padding: 2px;">0.236</span>	<i>biological</i>
Calculated FCU (Removal of Elements)	<span style="border: 1px solid black; padding: 2px;">0.215</span>	<i>chemical</i>

## Tree Calculations Data (WAA 4)

<b>Tree DBH and Basal Area</b>		
<b>Tree DBH (in.)</b>	<b>Tree Basal Area (Sq.Ft.)</b>	<b>Species</b>
19.00	1.969	<i>Fraxinus pennsylvanica</i>
5.00	0.136	<i>Triadica sebifera</i>
5.00	0.136	<i>Triadica sebifera</i>
6.00	0.196	<i>Triadica sebifera</i>
7.00	0.267	<i>Fraxinus pennsylvanica</i>
5.00	0.136	<i>Triadica sebifera</i>
13.00	0.922	<i>Fraxinus pennsylvanica</i>
7.00	0.267	<i>Triadica sebifera</i>
6.00	0.196	<i>Triadica sebifera</i>
3.00	0.049	<i>Triadica sebifera</i>
5.00	0.136	<i>Fraxinus pennsylvanica</i>
6.00	0.196	<i>Fraxinus pennsylvanica</i>
21.00	2.405	<i>Fraxinus pennsylvanica</i>
7.00	0.267	<i>Fraxinus pennsylvanica</i>
5.00	0.136	<i>Triadica sebifera</i>
4.00	0.087	<i>Fraxinus pennsylvanica</i>
4.00	0.087	<i>Fraxinus pennsylvanica</i>
8.00	0.349	<i>Fraxinus pennsylvanica</i>
7.00	0.267	<i>Triadica sebifera</i>
3.00	0.049	<i>Triadica sebifera</i>
7.00	0.267	<i>Fraxinus pennsylvanica</i>
10.00	0.545	<i>Fraxinus pennsylvanica</i>
7.00	0.267	<i>Fraxinus pennsylvanica</i>
17.00	1.576	<i>Fraxinus pennsylvanica</i>
<b>Total</b>		
187.00	10.913	

<b>Average Basal Area (Sq.Ft. per acre)</b>	
Plot Size (Sq.ft.))	4356
Sq.ft. per acre	43560
Total Basal Area (Sq.ft.)	10.913
Total BA per acre	109.135

0.10 (30 ft radius plot)

<b>Number of Trees (per acre)</b>	
Plot Size (Sq.ft.)	4356
Number of Trees	24
Total number of trees per acre	240

0.10 (30 ft radius plot)