# GREEN INFRASTRUCTURE

# IN THE VILLAGE OF CAMPTON HILLS

August 2010



#### **Prepared By:**

Trotter and Associates, Inc.
Consulting Engineers & Surveyors
40W201 Wasco Road, Suite D
St. Charles, Illinois 60175
(630) 587-0470

#### **ACKNOWLEDGEMENTS**

The project staff would like to acknowledge the Joint Environmental Resource Management Committee (Joint ERMC) for their considered and generous effort in reviewing materials, and providing thoughtful and constructive critique.

### **Project Team:**

Rob Linke, P.E., CFM, Trotter & Associates, Inc. Jack Shouba, Open Space Coordinator, Campton Township

### Joint Environmental Resource Management Committee:

Susan George, Chair, Representing the Village of Campton Hills Rolf Frederick, Representing the Village of Campton Hills James Kopec, Representing the Village of Campton Hills John Kupar, Representing Campton Township

(Mr. Linke & Mr. Shouba are also members of the Joint ERMC, representing the Village of Campton Hills & Campton Township, respectively).

# **Table of Contents**

| 1. | Pro   | JECT PURPOSE & SCOPE OF WORK                                          | 1       |
|----|-------|-----------------------------------------------------------------------|---------|
|    | 1.1   | GENERAL BACKGROUND                                                    | 2       |
|    | 1.2   | SCOPE OF WORK                                                         | 2       |
| 2. | DAT   | A SOURCES                                                             | 3       |
|    | 2.1   | Data Sources                                                          | 3       |
|    | 2.2   | Data Organization                                                     | 5       |
|    | 2.2   | .1 Green Infrastructure                                               | 6       |
|    | 2.2   | 2 Natural Resource Evaluation Zone                                    | 6       |
| 3. | GRE   | EN INFRASTRUCTURE DATA MAPS                                           | 7       |
|    | 3.1   | Map Summary                                                           | 7       |
|    |       | EXHIBIT 1: STREAMS, WETLANDS, AND WATERSHEDS                          | 8       |
|    |       | EXHIBIT 2: FLOODPLAINS                                                | 9       |
|    |       | EXHIBIT 3: PUBLIC LAND                                                | 10      |
|    |       | EXHIBIT 4: PRIVATE LAND                                               | 11      |
|    |       | EXHIBIT 5: T&E SPECIES                                                | 12      |
|    |       | EXHIBIT 6: AQUIFER RECHARGE & SENSITIVITY                             | 13      |
|    |       | EXHIBIT 7: FEN RECHARGE AREAS                                         | 14      |
|    |       | EXHIBIT 8: HISTORIC WOODLANDS                                         | 15      |
|    |       | EXHIBIT 9: HISTORIC LANDCOVER                                         | 16      |
|    |       | EXHIBIT 10: GREEN INFRASTRUCTURE SUMMARY MAP                          | 17      |
|    |       |                                                                       |         |
| 4. |       | EN INFRASTRUCTURE MAPS                                                | 18 – 2  |
|    | GREE  | NINFRASTRUCTURE AND NATURAL RESOURCE EVALUATION ZONE AREAS ON ONE MAP |         |
| 5. |       | ULATED GREEN INFRASTRUCTURE DATA MAPS                                 | 28 – 34 |
|    | Layei | RS USED TO CREATE THE REGULATED GREEN INFRASTRUCTURE AREAS            |         |
| 6. |       | URAL RESOURCE EVALUATION ZONE DATA MAPS                               |         |
|    | LAYE  | RS USED TO CREATE THE NATURAL RESOURCE EVALUATION AREAS               |         |

## 1. PROJECT PURPOSE AND SCOPE OF WORK

#### 1.1 GENERAL BACKGROUND

The Village of Campton Hills is concerned about protecting and maintaining the natural resources within the Village and the surrounding region. It is estimated that there are more than 3000 acres of land within the Village's planning jurisdiction that could undergo some type of landuse change in the future. Village officials have acknowledged that there are limitations in how the community's existing ordinances as well as county, state and federal regulations preserve and protect the irreplaceable natural resources in the region. These natural resources, comprised of wetlands, woodlands, streams, and the ecological communities they support, are collectively referred to as green infrastructure.

At the community/regional scale, green infrastructure is defined as the interconnected network of natural areas and open spaces that conserve natural ecosystem values and functions; sustain clean air and water, and provide a wide array of benefits to both people and wildlife. At the site/neighborhood scale, green infrastructure can also be defined as the engineered or designed landscapes constructed to maintain natural hydrologic functions through infiltration or filtering of rain & snow as close as possible to where it falls. Types of engineered/designed, site-scale green infrastructure include permeable pavement, rain gardens, bioretention basins, bioswales, infiltration basins, wetland-style stormwater basins, and green roofs. There are many excellent resources to learn more about site-scale green infrastructure practices, including the USEPA's Green Infrastructure website (Google search "EPA Green Infrastructure" for the link).

#### 1.2 SCOPE OF WORK

The purpose of this report is to document and organize the <u>planning-level</u> natural resource data to create a map of community or regional scale green infrastructure. This green infrastructure layer can be utilized by the Village to effectively incorporate the region's green infrastructure into future developments under its jurisdiction as well as other units of government. It can also be used as an educational tool to show existing residents and homeowner associations where the community's green infrastructure is located within their parcels and how they can manage those areas to both protect and enhance the integrity of those interconnected natural areas that span their property.

Mark Benedict, The Conservation Fund

# 2. DATA COLLECTION

### 2.1 DATA SOURCES

An inventory of available natural resource information was completed for the area which approximates the Village's 1.5 mile planning area (Village boundary as of October 2009 buffered out 1.5 miles). A key criteria in the determination of resource information was the availability of data in a geographic information system (GIS) format. A summary of the collected natural resource data is shown in Table 2.1 below.

|                                                    | TABLE 2.1<br>GREEN INFRASTRUCTURE DATA LAYERS                                                                                                                                                  |                                                |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Data Type                                          | Description                                                                                                                                                                                    | Data Source                                    |
| 100 Year Floodplain                                | 100 year floodplain boundary (Zone AE/AH floodplain boundaries determined using engineering methods and including defined floodplain elevations); Updated 4 <sup>th</sup> Quarter 2009 by FEMA | Kane County<br>Water Resources<br>Dept. (2009) |
| Wetlands                                           | Kane County Advanced Identification (ADID) Wetland<br>Study                                                                                                                                    | Kane County<br>Env. Mgmt<br>(2004)             |
| Streams                                            | Stream channel centerlines                                                                                                                                                                     | Kane County<br>GIS (2009)                      |
| Threatened & Endangered Species                    | Location of known Threatened or Endangered Species recorded by the IL Dept of Natural Resources-Office of Resource Conservation (T&E presence or absence by township section)                  | IDNR-ORC (2009)                                |
| Public Open Space –<br>Kane Co Forest<br>Preserve  | Property owned & maintained by the Kane County Forest<br>Preserve District                                                                                                                     | Kane Co GIS<br>(2009)                          |
| Public Open Space –<br>Campton Township            | Park property owned & maintained by Campton Township                                                                                                                                           | Kane Co GIS<br>(2009)                          |
| Public Open Space –<br>St Charles Park<br>District | Park property owned & maintained by the St Charles Park District                                                                                                                               | Kane Co GIS<br>(2009)                          |
| Public Open Space –<br>South Elgin                 | Park property owned & maintained by the Village of South Elgin                                                                                                                                 | Kane Co GIS<br>(2009)                          |
| Private Open Space –<br>HOAs                       | Private open space parcels under control of homeowner's associations                                                                                                                           | Kane Co GIS (2009)                             |
| Private Open Space – other                         | Private open space parcels other than HOAs (such as golf courses)                                                                                                                              | Kane Co GIS (2009)                             |
| Private Open Space – conservation easements        | Private open space parcels with conservation easements                                                                                                                                         | Campton<br>Township (2009)                     |
| Fens                                               | Fen wetlands as defined in 2004 Kane County Fen Identification and Recharge Area Mapping Project                                                                                               | Kane County<br>Env.<br>Mgmt(2009)              |

|                                   | TABLE 2.1 (continued) GREEN INFRASTRUCTURE DATA LAYERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Data Type                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Data Source                       |
| Fen Recharge Areas                | Areas adjacent to fen wetlands defined as contributing to the hydrology necessary to support the identified fen. (2004 Kane County Fen Identification and Recharge Area Mapping Project)                                                                                                                                                                                                                                                                                                                                                                                      | Kane County<br>Env. Mgmt          |
| Farmed Wetlands                   | Agricultural areas that have been cleared, partially drained, or filled. These areas are saturated enough or have enough ponded water that generally the area is too wet to plant or harvest, or yields are significantly reduced. These areas may not be regulatory wetlands, but these do indicate areas of naturally occurring ponding and provide opportunities for wetland restoration. Data extracted from Kane County ADID Wetland Study                                                                                                                               | Kane County<br>Env. Mgmt          |
| Aquifer Recharge<br>Areas         | Areas determined in the 2006 USGS Campton Twp<br>Groundwater Study to provide groundwater recharge to<br>domestic or production wells in Campton Township or areas<br>east of the Township (wells in St Charles area)                                                                                                                                                                                                                                                                                                                                                         | USGS                              |
| High Sensitivity<br>Aquifer Areas | Kane County Aquifer Sensitivity Map (2007; prepared by ISGS). Class A1 to A4 aquifer layers are defined as areas where the upper surface of the aquifer is within 20 feet of the land surface and with sand and gravel or high-permeability bedrock aquifers greater than 20 feet thick. Map Unit A is classified as an area of high aquifer sensitivity. In these areas, contaminants from any source can move rapidly through the sand and gravel deposits to wells or nearby streams. Land use practices should be very conservative in all areas mapped as Class A1 – A4. | ISGS                              |
| Critical Woodland<br>Areas        | Contiguous wooded areas larger than 4 acres on undeveloped parcels which contained woodlands in the same locations in 1939 (verified through inspection of 1939 aerial photos in GIS)                                                                                                                                                                                                                                                                                                                                                                                         | TAI <sup>1</sup>                  |
| Approximated<br>Floodplain Areas  | 100 Year Floodplain area determined using approximate methods; no detailed analysis to establish base flood elevations completed. Updated 4 <sup>th</sup> Quarter 2009 by FEMA.                                                                                                                                                                                                                                                                                                                                                                                               | Kane County Water Resources Dept. |
| Hydric Soils                      | Soils that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Good indicator of location of historic wetlands in agricultural areas where landuse practices have altered the natural drainage. Hydric soil corridors are frequently used as "connecting routes" between isolated wetlands and stream corridor networks in green infrastructure planning.                                                                                                                     | Kane County<br>GIS (2009)         |

<sup>1</sup>This data was created by Trotter & Associates, Inc. in ArcMap using 1939 and 2008 aerial photos provided by Kane County GIS Technologies Department.

2.2 DATA ORGANIZATION

The collected natural resource GIS data was evaluated for use in the creation of a green infrastructure boundary for the Village. A review of the data indicated nearly all of the layers were related to water resources and areas associated with streams, wetlands, and floodplains, which is not surprising, as these areas are currently regulated by county, state and federal regulations to insure public safety and critical ecosystem protection<sup>1</sup>. The Village has expressed a concern regarding the protection of existing natural upland areas such as woodlands. A woodland / forest GIS layer was not available. Therefore, Trotter & Associates, Inc. developed a protocol to identify existing woodland areas using remote sensing/GIS methods that were the best candidates for protection and restoration to provide critical upland forest habitat.

The first step in identifying critical woodland areas was to identify woodlands in the study area which existed in the earliest available geographically defined records. The best available records for this was found to be the aerial photographs completed by the Soil Conservation Service in 1939, which have been scanned and projected into Illinois State Plane coordinates by Kane County GIS Technologies Department. All woodlands in the study area on the 1939 aerial photos were digitized. This digitized layer was then compared to the woodlands which still remained in those locations based upon the 2006 and 2008 County aerial photos. In most cases, woodlands remaining in 2008 were extensively fragmented and encroached upon by residential subdivision development. Woodlands larger than 4 acres occurring primarily on undeveloped parcels were considered to be "critical woodland areas". Twenty two woodlands were identified as having these attributes, ranging in size from 4.1 acres to more than 200 acres.

The data layers were organized into two (2) categories: Regulated Green Infrastructure and Natural Resource Evaluation Zone. This was done to differentiate natural resource data related to surface features which are at least partially protected through the existing laws and governmental agencies versus data that is not tied to surface features but are nonetheless important for the protection of community natural resources such as groundwater quantity and quality.

<sup>&</sup>lt;sup>1</sup> Most recorded threatened and endangered species in Illinois occur in wetland and stream ecosystems.

| Table 2.2                                                                                                     |                                                                                       |  |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|
| Natural Resource Data Layers used to create Regulated Green Infrastructure & Natural Resource Evaluation Zone |                                                                                       |  |
| Regulated Green Infrastructure & I                                                                            | Natural Resource Evaluation Zone                                                      |  |
| Regulated Green Infrastructure                                                                                | <b>Natural Resource Evaluation Zone</b>                                               |  |
| 100 Year Floodplains (studied)                                                                                | Aquifer Recharge Areas (USGS Study)                                                   |  |
| Wetlands (ADID)                                                                                               | High Sensitivity Aquifer Areas (ISGS Data)                                            |  |
| Streams                                                                                                       | Fen Recharge Areas (Kane County)                                                      |  |
| Threatened & Endangered Species                                                                               | Farmed Wetlands (ADID)                                                                |  |
| Publicly Protected Open Space                                                                                 | Approximated 100 Year Floodplain areas (unstudied/estimated)                          |  |
| Privately Protected Open Space                                                                                | Critical Woodland Areas                                                               |  |
|                                                                                                               | Hydric Soils (used for connecting isolated green infrastructure units to one another) |  |

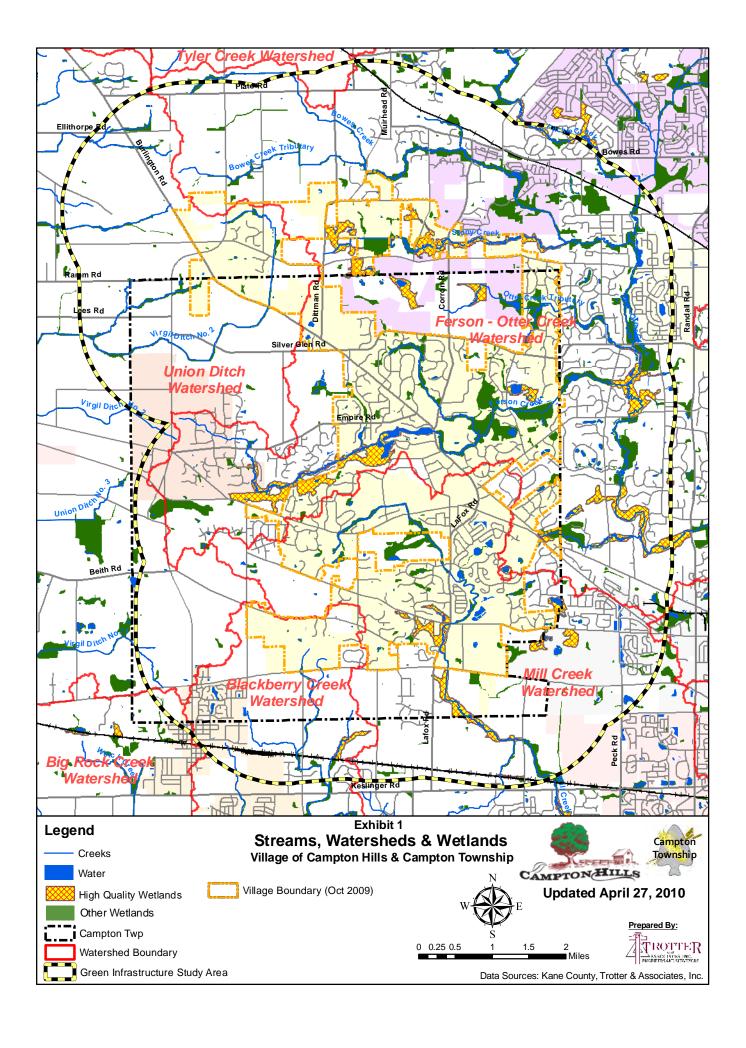
## 3. GREEN INFRASTRUCTURE DATA MAPS

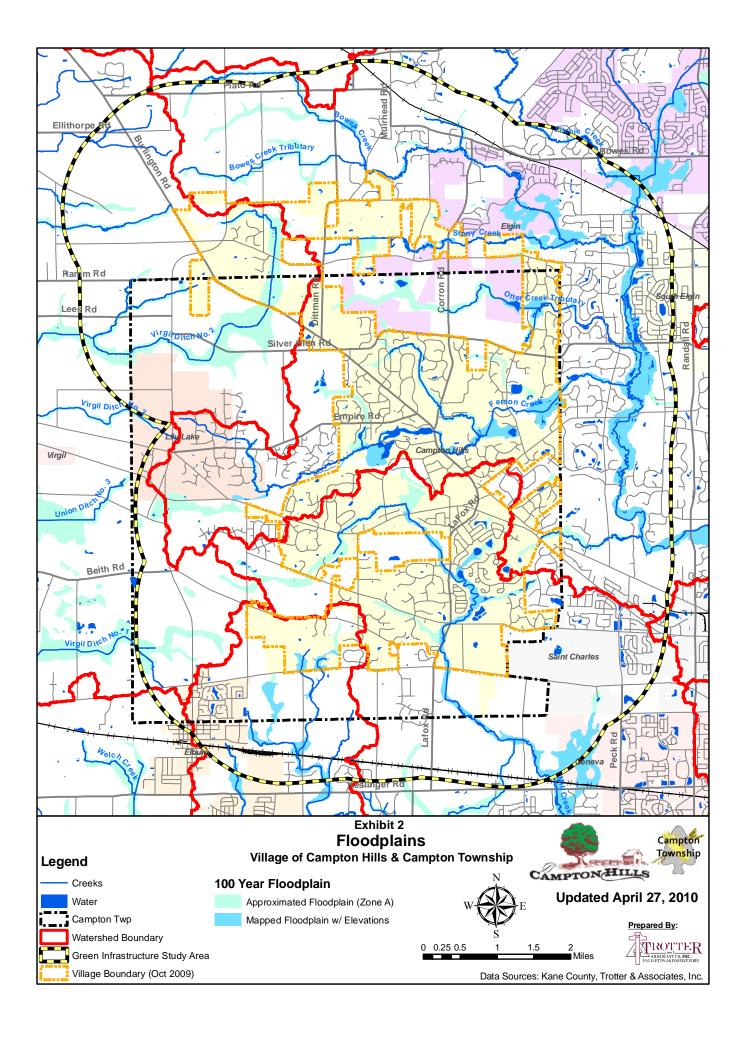
# 3.1 MAP SUMMARY

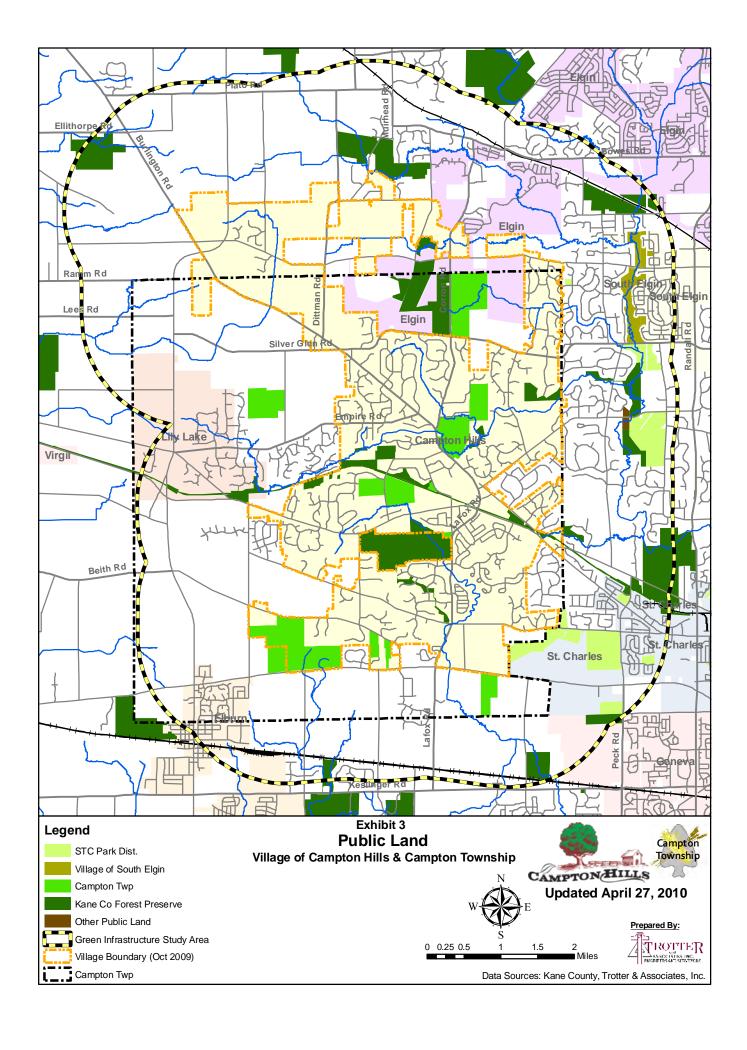
The natural resource data used to create the Regulated Green Infrastructure Boundary (RGIB) and the Natural Resource Evaluation Zone (NREZ) are presented on Exhibits 1 – 9. A summary map of the study area showing the RGIB and NREZ is presented on Exhibit 10. Detailed maps of the study area are presented in Section 4. Analysis of data layers indicates that about 20.7% of the Village Planning Area is contained within the Regulated Green Infrastructure Boundary. The Natural Resource Evaluation Zone accounts for an additional 20.0% of the Village's planning area.

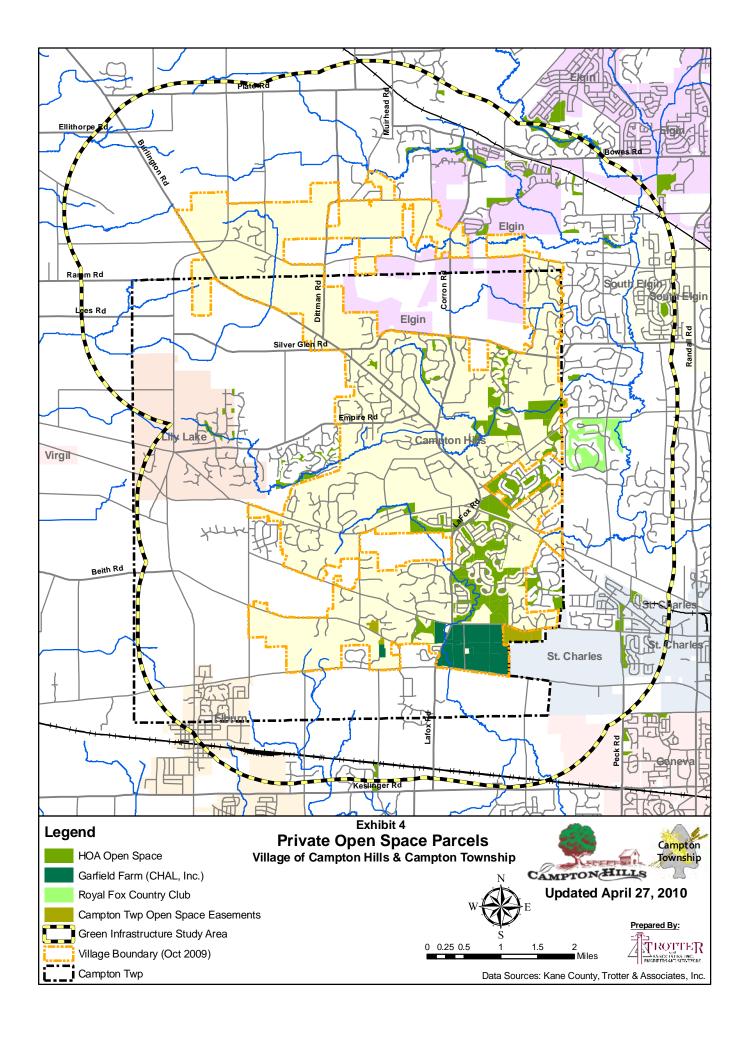
| Location                                            | Area (acres) | Percentage |
|-----------------------------------------------------|--------------|------------|
| Area within Green Infrastructure Study Area         | 43,084       |            |
| Area within Regulated Green Infrastructure Boundary | 8,908        | 20.7%      |
| Area within Natural Resource Evaluation Zone        | 8,602        | 20.0%      |

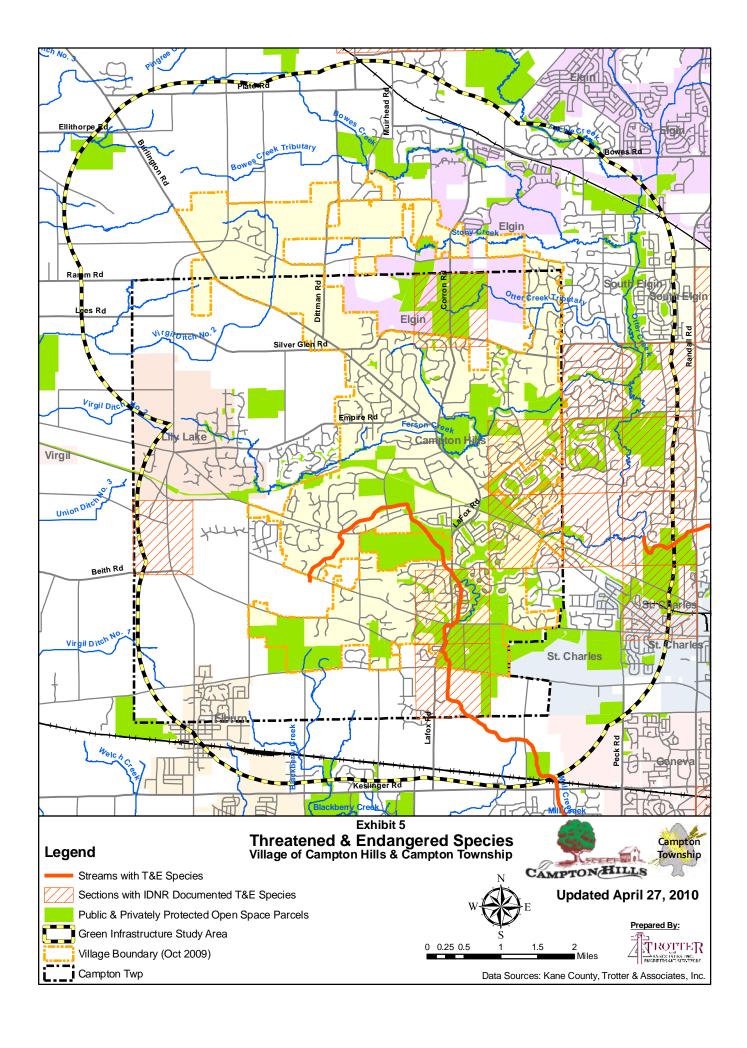
Area of Village as of October 2009 = 11,416 acres

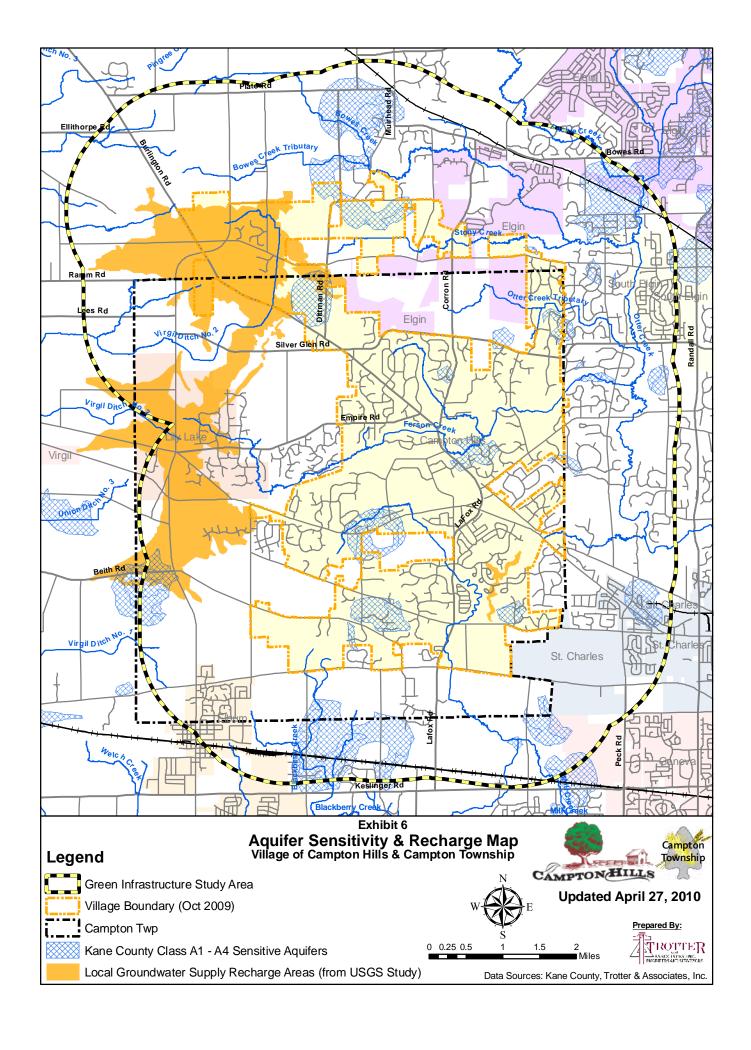


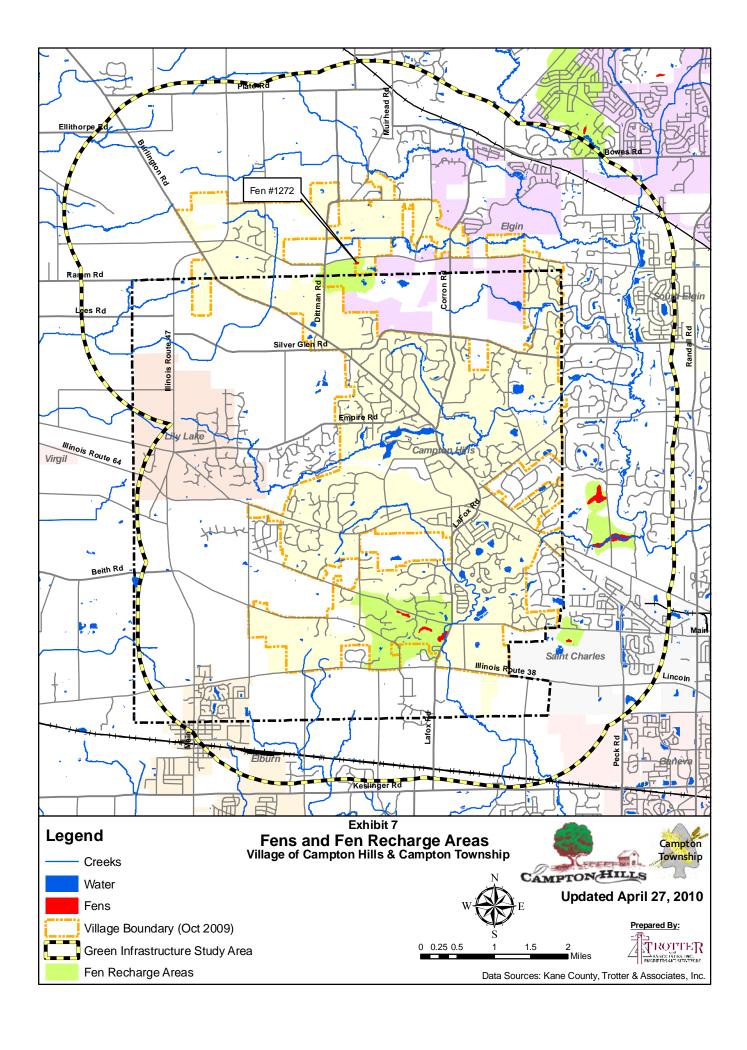


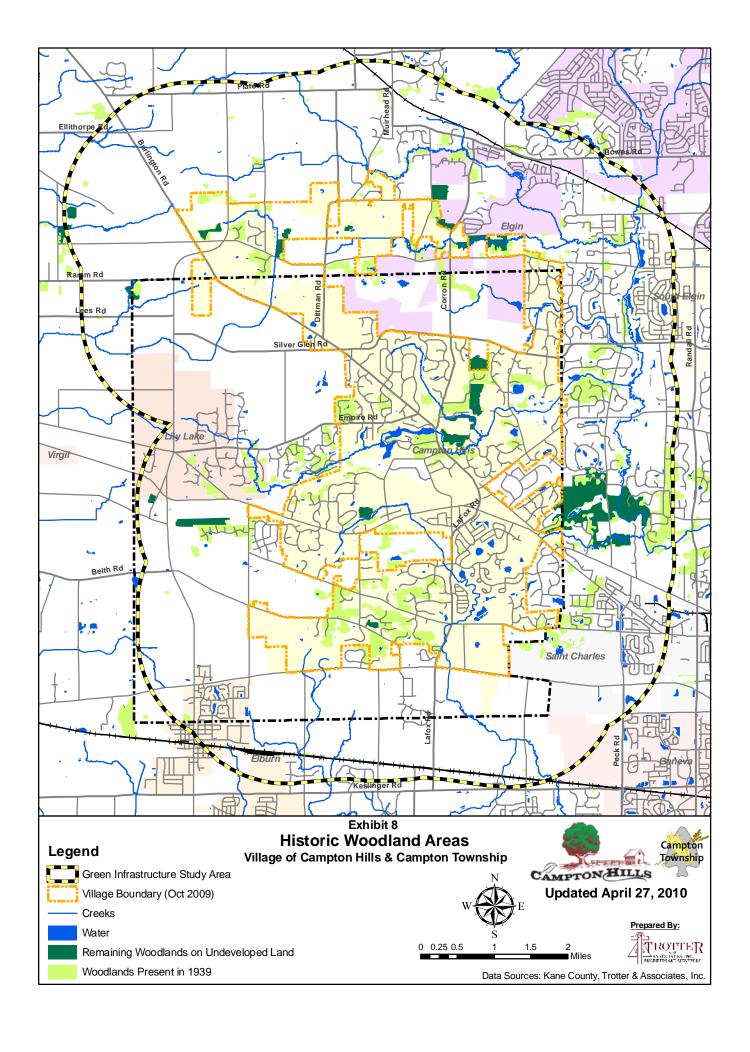


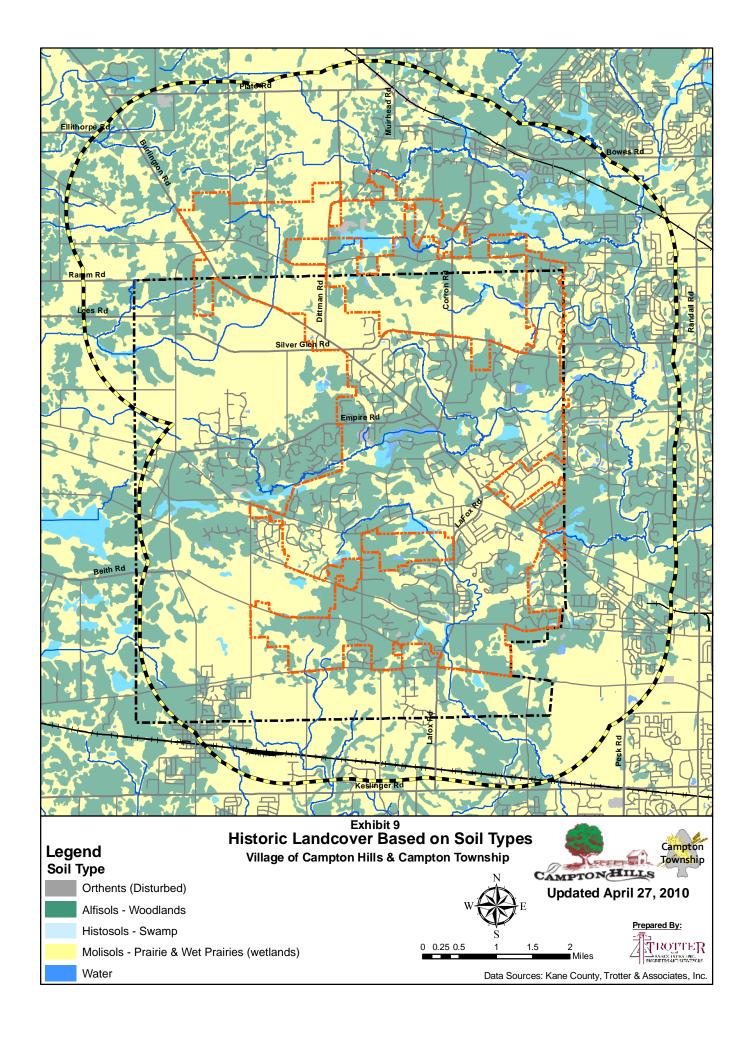


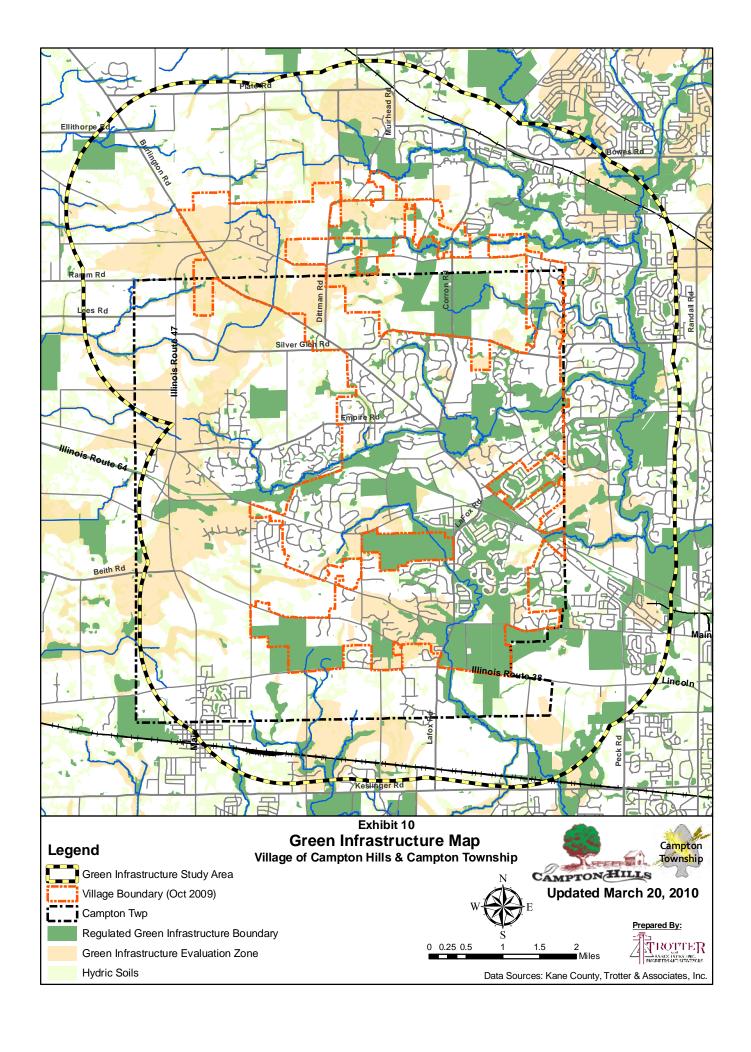


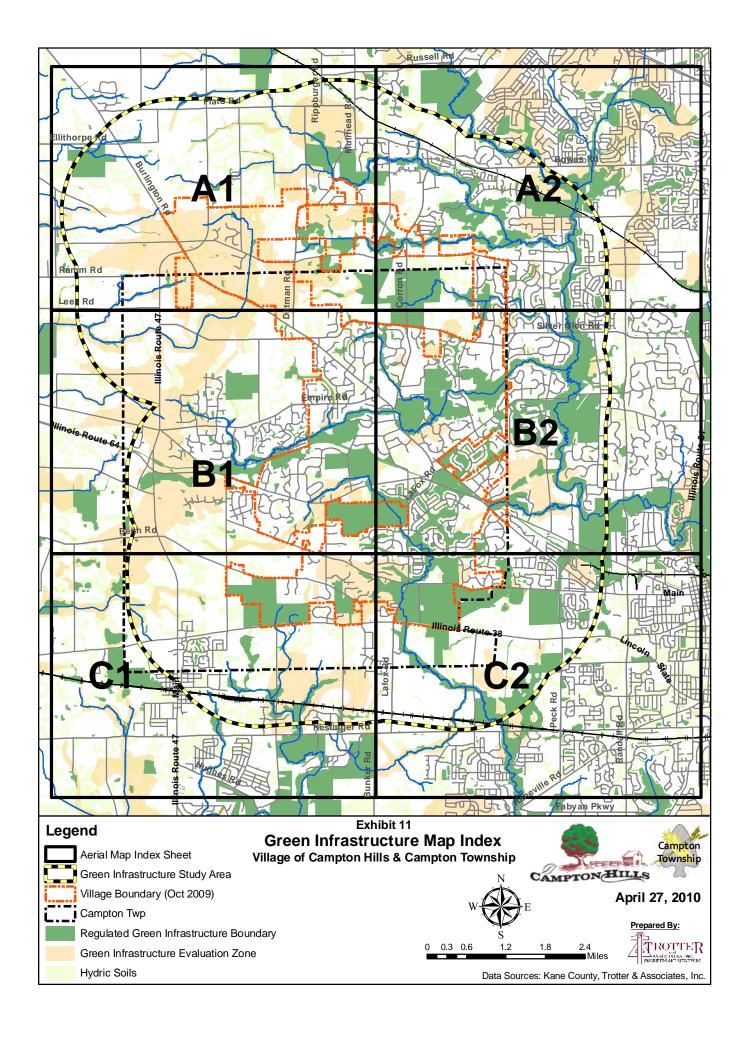




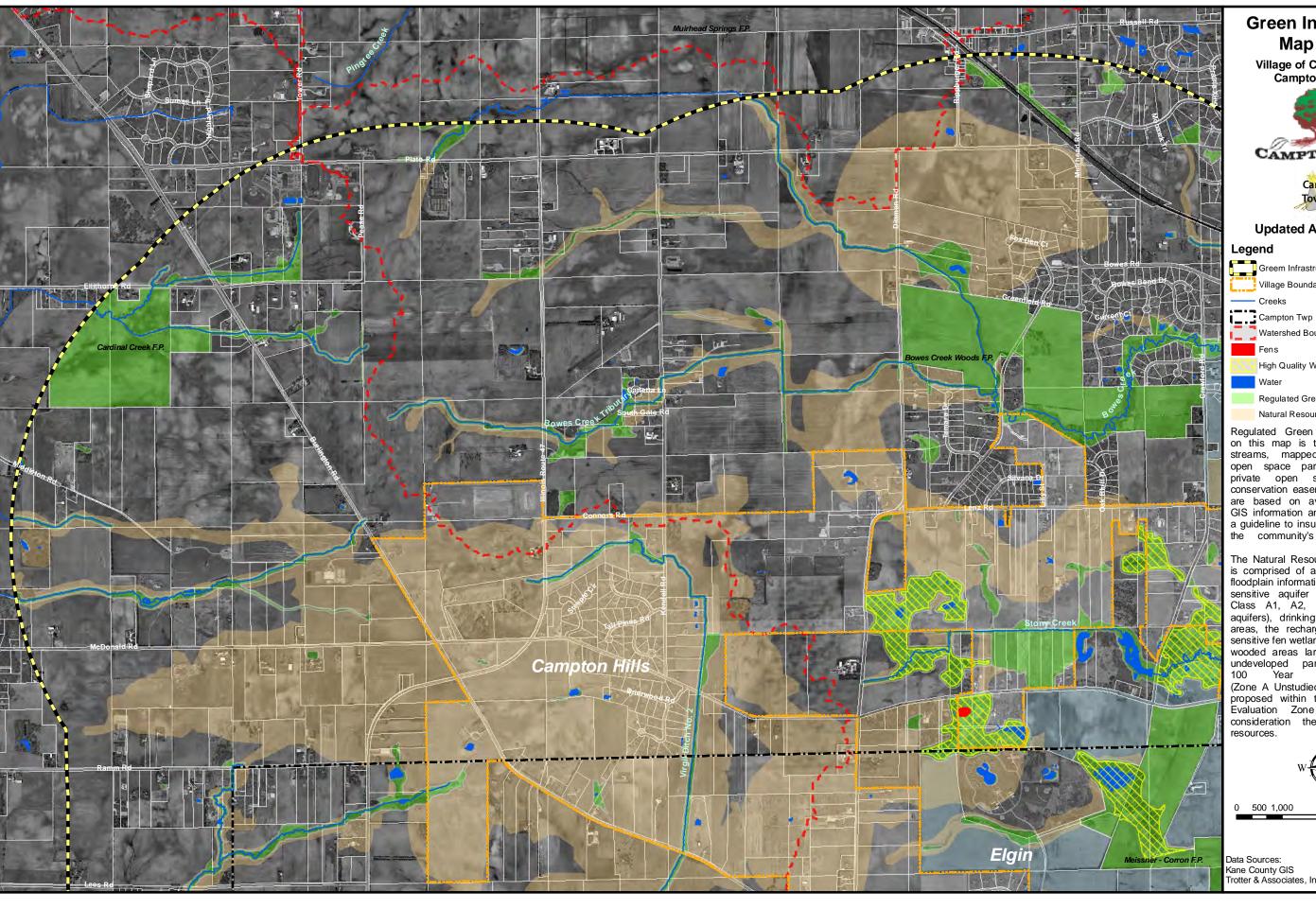








| 4. | GREEN INFRASTRUCTURE MAPS |
|----|---------------------------|
|    |                           |
|    |                           |
|    |                           |
|    |                           |
|    |                           |
|    |                           |
|    | 19                        |



# **Green Infrastructure** Map Area A1

Village of Campton Hills & Campton Township



# **Updated August 2010**

Greem Infrastructure Study Area Boundary Village Boundary (Oct 2009)

Watershed Boundary

High Quality Wetlands

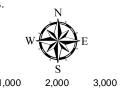
Water

Regulated Green Infrastructure

Natural Resource Evaluation Zone

Regulated Green Infrastructure shown on this map is the sum of wetlands, streams, mapped floodplains, public open space parcels, and dedicated private open space parcels and conservation easements. These areas are based on available planning-level GIS information and should be used as a guideline to insure the preservation of the community's natural resources.

The Natural Resources Evaluation Zone is comprised of aquifer and additional floodplain information. This zone contains sensitive aquifer areas (Kane County Class A1, A2, A3, or A4 shallow aquifers), drinking water well recharge areas, the recharge areas supporting sensitive fen wetland communities, upland wooded areas larger than 5 acres on undeveloped parcels, or estimated . Year Floodplain (Zone A Unstudied). Any development proposed within the Natural Resource Evaluation Zone should take into consideration the impact on these resources.

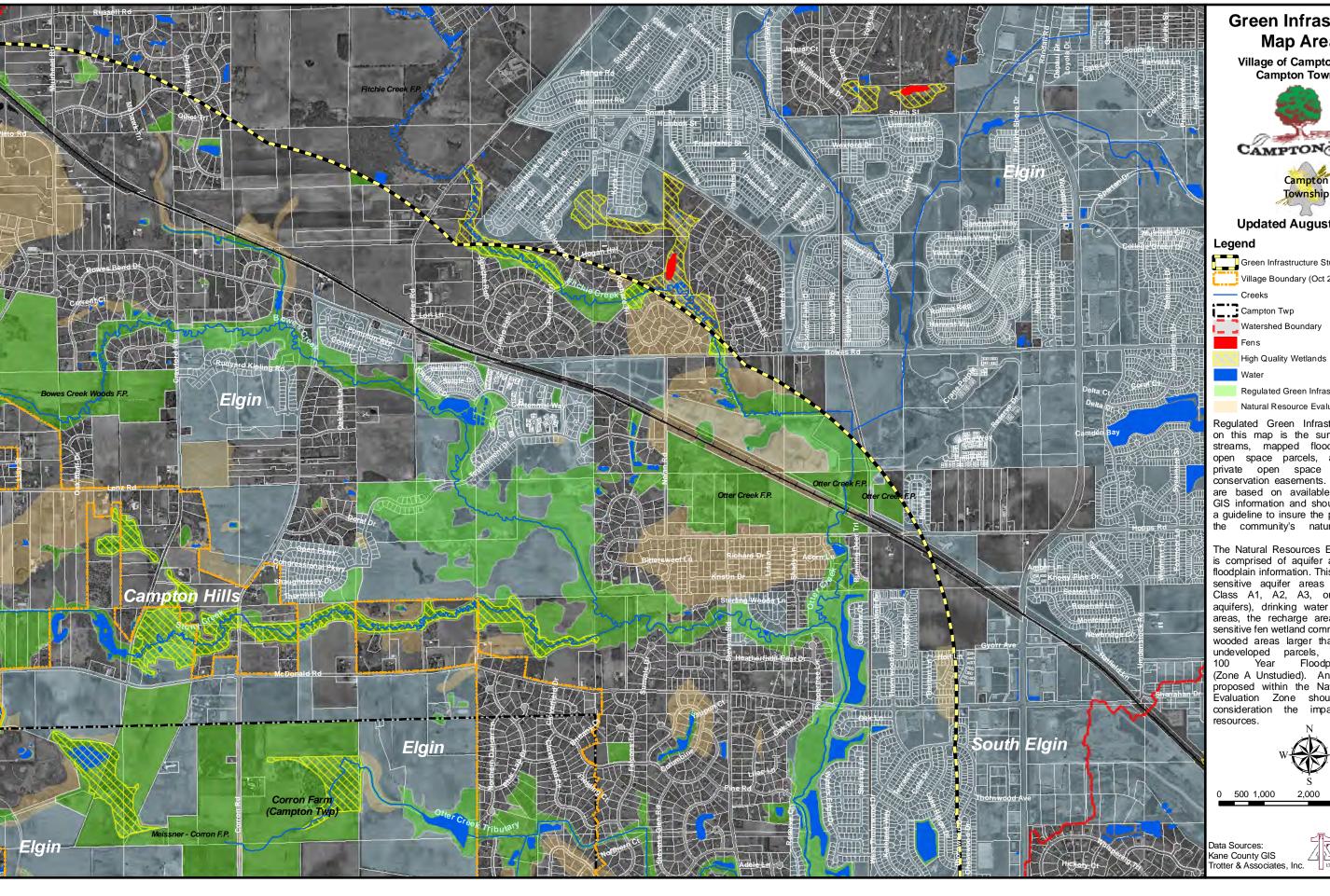


0 500 1,000

Prepared By:

Data Sources: Kane County GIS rotter & Associates, Inc.





# **Green Infrastructure** Map Area A2

Village of Campton Hills & Campton Township



# **Updated August 2010**

Township

Green Infrastructure Study Area Boundary Village Boundary (Oct 2009)

- Creeks

Watershed Boundary

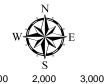
Water

Regulated Green Infrastructure

Natural Resource Evaluation Zone

Regulated Green Infrastructure shown on this map is the sum of wetlands, streams, mapped floodplains, public open space parcels, and dedicated private open space parcels and conservation easements. These areas are based on available planning-level GIS information and should be used as a guideline to insure the preservation of the community's natural resources.

The Natural Resources Evaluation Zone is comprised of aquifer and additional floodplain information. This zone contains sensitive aquifer areas (Kane County Class A1, A2, A3, or A4 shallow aquifers), drinking water well recharge areas, the recharge areas supporting sensitive fen wetland communities, upland wooded areas larger than 5 acres on undeveloped parcels, or estimated . Year Floodplain (Zone A Unstudied). Any development proposed within the Natural Resource Evaluation Zone should take into consideration the impact on these

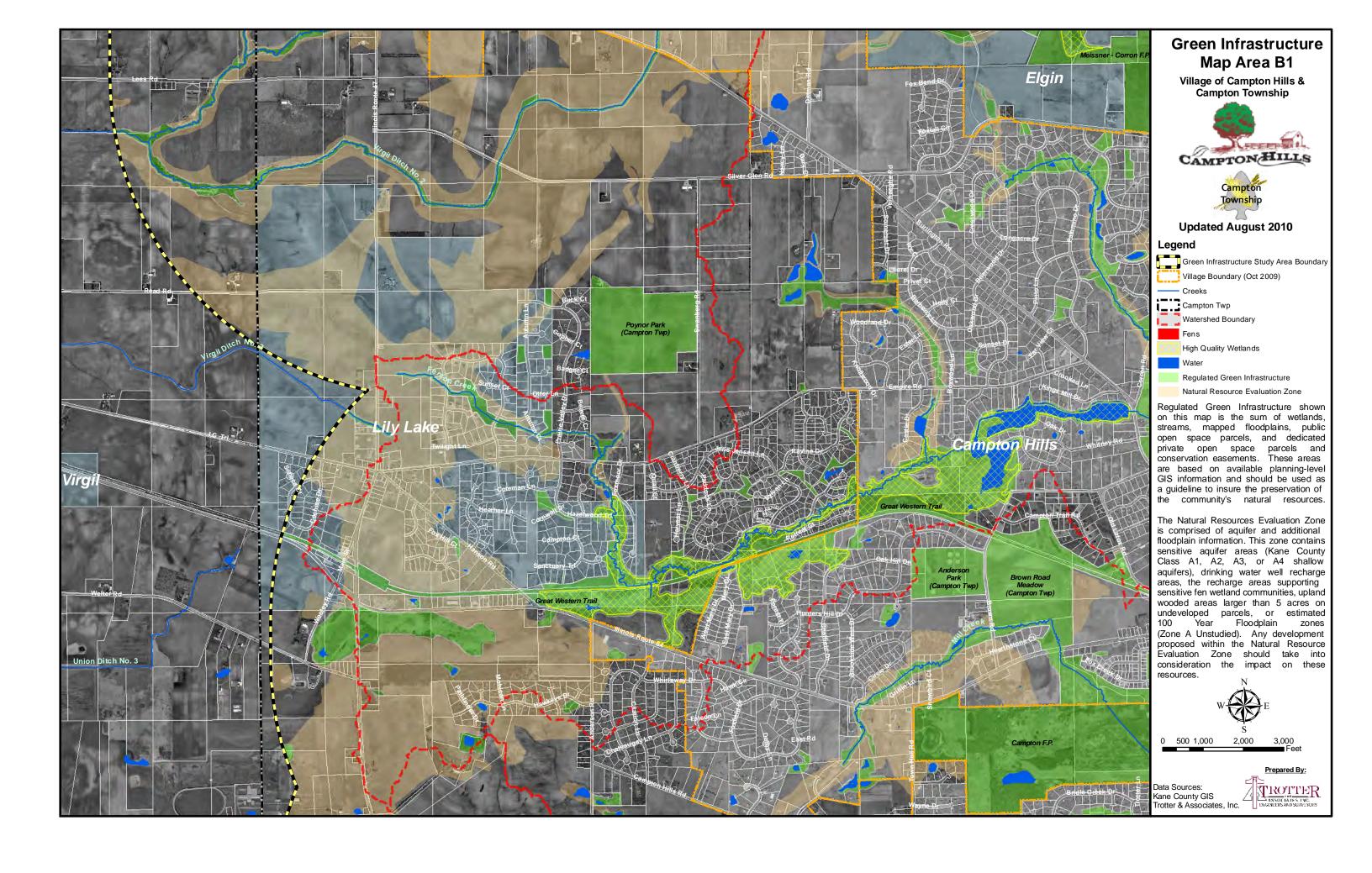


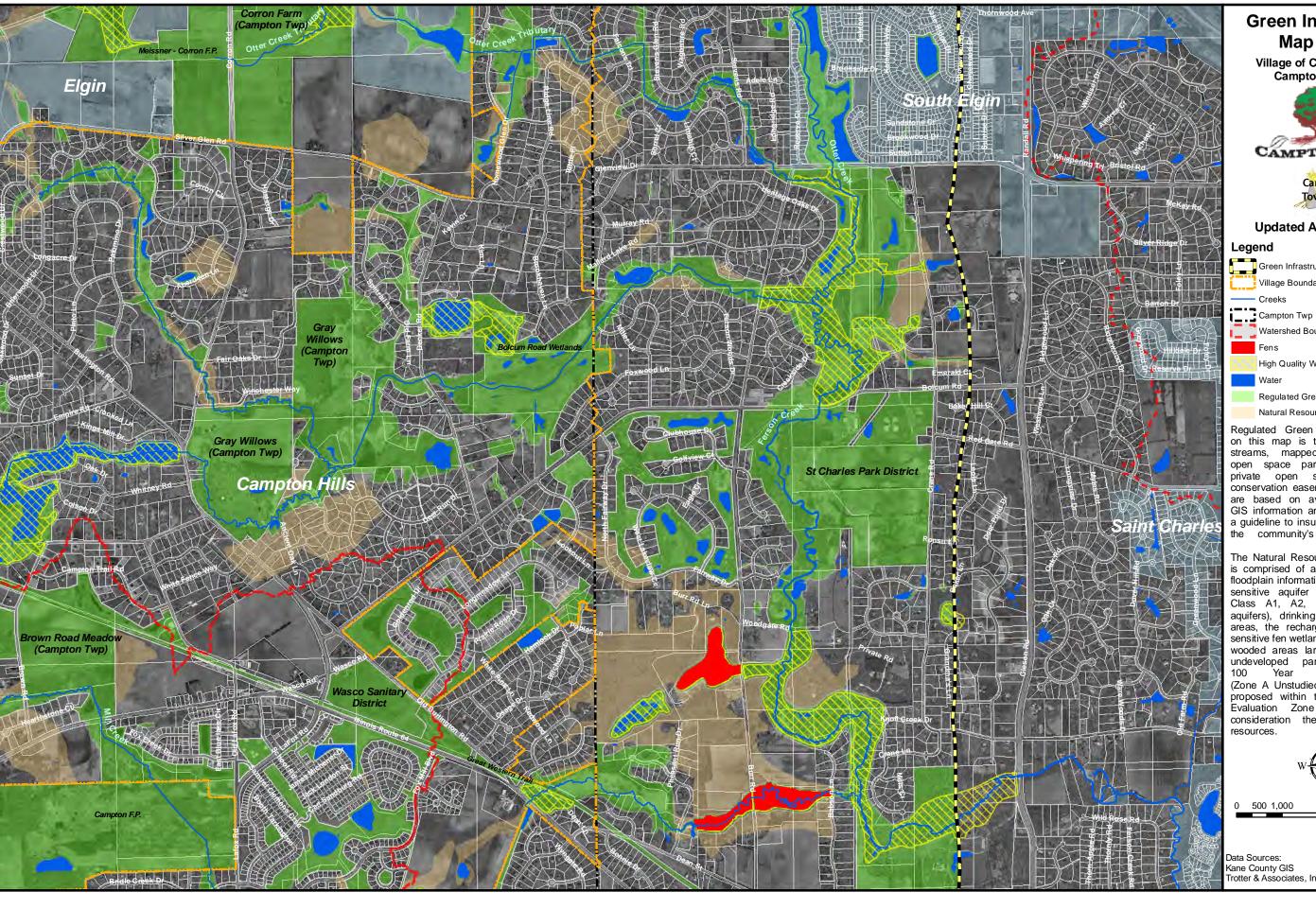
0 500 1,000

Prepared By:

Data Sources: Kane County GIS







# **Green Infrastructure** Map Area B2

Village of Campton Hills & Campton Township



#### **Updated August 2010**

Green Infrastructure Study Area Boundary Village Boundary (Oct 2009)

Watershed Boundary

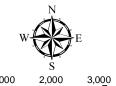
High Quality Wetlands

Regulated Green Infrastructure

Natural Resource Evaluation Zone

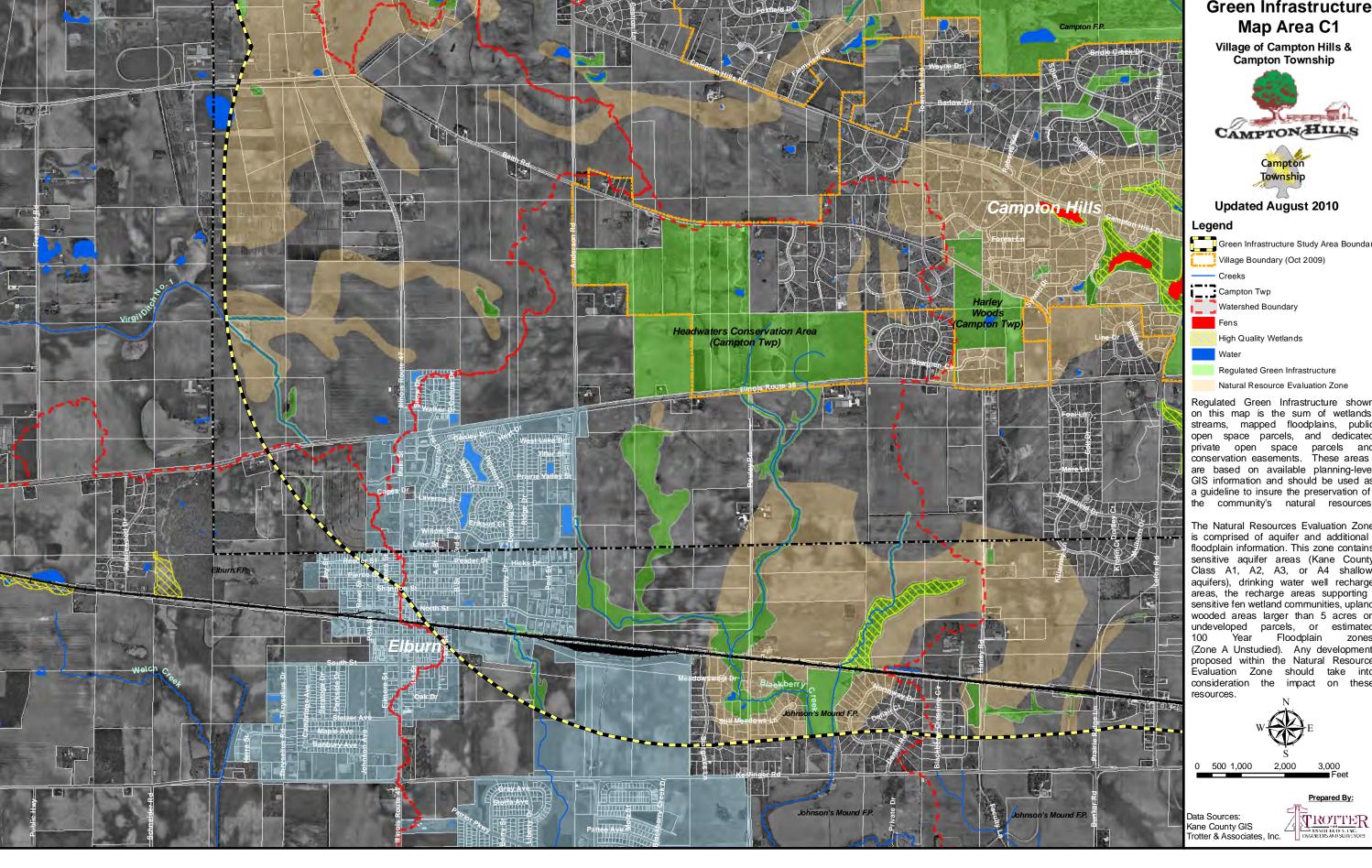
Regulated Green Infrastructure shown on this map is the sum of wetlands, streams, mapped floodplains, public open space parcels, and dedicated private open space parcels and conservation easements. These areas are based on available planning-level GIS information and should be used as a guideline to insure the preservation of the community's natural resources.

The Natural Resources Evaluation Zone is comprised of aquifer and additional floodplain information. This zone contains sensitive aquifer areas (Kane County Class A1, A2, A3, or A4 shallow aquifers), drinking water well recharge areas, the recharge areas supporting sensitive fen wetland communities, upland wooded areas larger than 5 acres on undeveloped parcels, or estimated . Year Floodplain (Zone A Unstudied). Any development proposed within the Natural Resource Evaluation Zone should take into consideration the impact on these resources.



Prepared By:

TROTTER Kane County GIS otter & Associates, Inc.



# **Green Infrastructure** Map Area C1

Village of Campton Hills & Campton Township

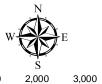


Green Infrastructure Study Area Boundary

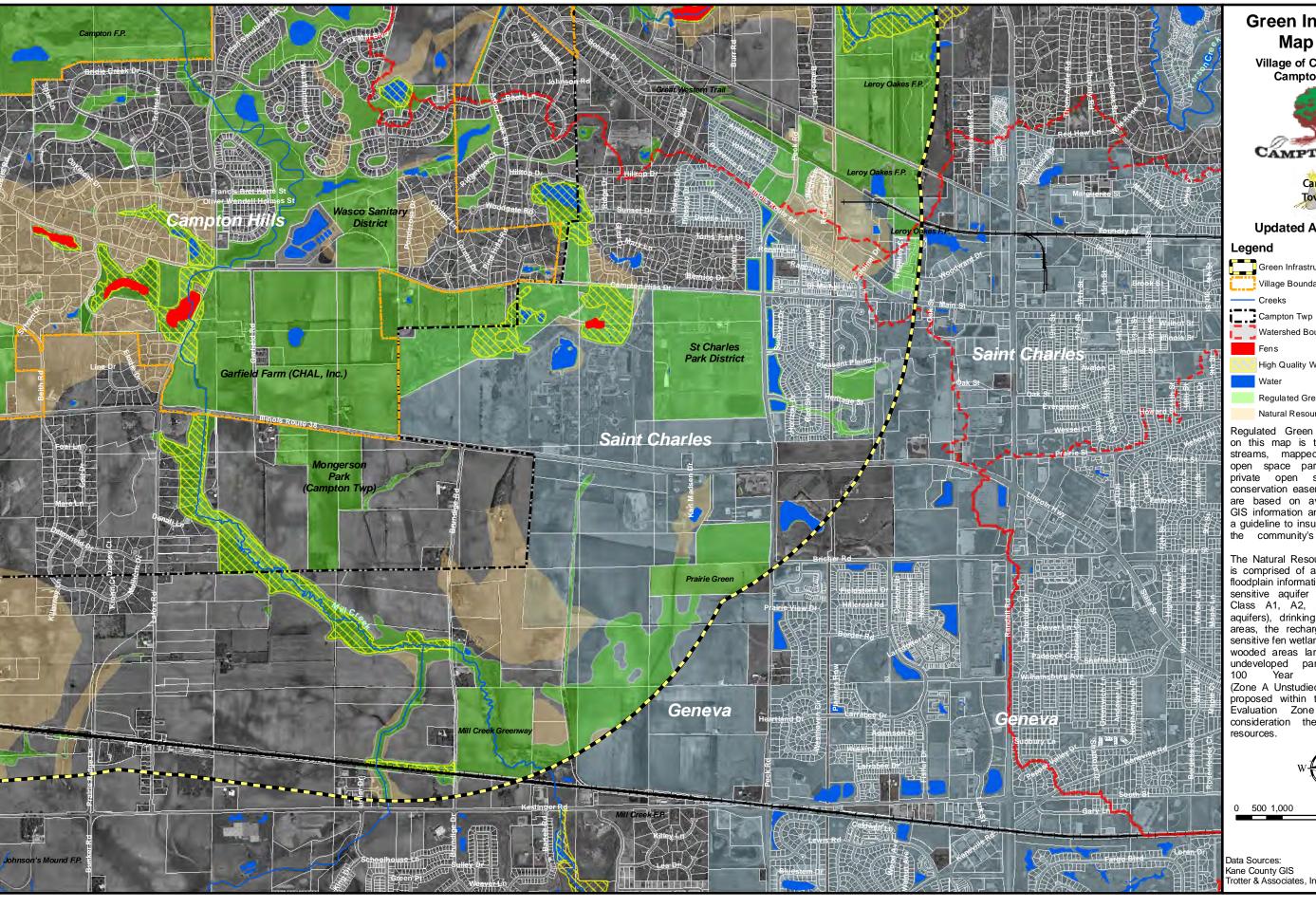
Natural Resource Evaluation Zone

Regulated Green Infrastructure shown on this map is the sum of wetlands, streams, mapped floodplains, public open space parcels, and dedicated private open space parcels and conservation easements. These areas are based on available planning-level GIS information and should be used as a guideline to insure the preservation of the community's natural resources.

The Natural Resources Evaluation Zone is comprised of aquifer and additional floodplain information. This zone contains sensitive aquifer areas (Kane County Class A1, A2, A3, or A4 shallow aquifers), drinking water well recharge areas, the recharge areas supporting sensitive fen wetland communities, upland wooded areas larger than 5 acres on undeveloped parcels, or estimated Floodplain (Zone A Unstudied). Any development proposed within the Natural Resource Evaluation Zone should take into consideration the impact on these



Prepared By:



# **Green Infrastructure** Map Area C2

Village of Campton Hills & Campton Township



### **Updated August 2010**

Green Infrastructure Study Area Boundary Village Boundary (Oct 2009)

Watershed Boundary

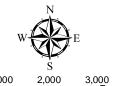
High Quality Wetlands

Regulated Green Infrastructure

Natural Resource Evaluation Zone Regulated Green Infrastructure shown

on this map is the sum of wetlands, streams, mapped floodplains, public open space parcels, and dedicated private open space parcels and conservation easements. These areas are based on available planning-level GIS information and should be used as a guideline to insure the preservation of the community's natural resources.

The Natural Resources Evaluation Zone is comprised of aquifer and additional floodplain information. This zone contains sensitive aquifer areas (Kane County Class A1, A2, A3, or A4 shallow aquifers), drinking water well recharge areas, the recharge areas supporting sensitive fen wetland communities, upland wooded areas larger than 5 acres on undeveloped parcels, or estimated . Year Floodplain (Zone A Unstudied). Any development proposed within the Natural Resource Evaluation Zone should take into consideration the impact on these resources.



Prepared By:

Data Sources: Kane County GIS



| 5. | REGULATED GREEN INFRASTRUCTURE |  |
|----|--------------------------------|--|
|    | DATA MAPS                      |  |
|    | DATA MIAPS                     |  |
|    | DATA MIAPS                     |  |

