TOWN OF ST. JOHN, LAKE COUNTY, INDIANA

RESOLUTION NO. 2020-10-28A

A RESOLUTION ADOPTING THE AMENDMENT TO THE THOROUGHFARE PLAN IN THE COMPREHENSIVE PLAN OF THE TOWN OF ST. JOHN, LAKE COUNTY, INDIANA, AND ALL MATTERS RELATED THERETO.

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WHEREAS, the Plan Commission of the Town of St. John, Lake County, Indiana (hereinafter, the "Plan Commission"), has reviewed all matters pertaining to certain amendments to the Thoroughfare Plan set forth in and a part of the Comprehensive Plan for the Town of St. John, Lake County, Indiana; and

WHEREAS, on October 21, 2020, the Plan Commission conducted a duly advertised and properly noticed public hearing regarding these matters and thereupon considered the amendments to the Thoroughfare Plan set forth in and a part of the Comprehensive Plan for the Town of St. John, Lake County, Indiana; and

STATE OF INDIANA
LAKE COUNTY
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MICHAEL B BROWN
RECORDER

2020-083194

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WHEREAS, the Plan Commission, at the conclusion of said public hearing, approved a motion to certify a favorable recommendation to the St. John Town Council for consideration of the approval of said amendments to the Thoroughfare Plan set forth in and a part of the Comprehensive Plan for the Town of St. John; and

WHEREAS, the Town Council of the Town of St. John, Lake County, Indiana, (hereinafter, the "Town Council"), having reviewed the proposed amendments to the Thoroughfare Plan set forth in and a part of the Comprehensive Plan for the Town of St. John, as well as the favorable recommendation Certification of the Plan Commission regarding the same, now finds that approval of said amendments to the Thoroughfare Plan set forth in and a part of the Comprehensive Plan for the Town of St. John as presented, is advisable, appropriate, and in the best interests of the citizens and residents of the Town of St. John .

NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF ST. JOHN, LAKE COUNTY, INDIANA, AS FOLLOWS:

SECTION ONE: That the amendments to the Thoroughfare Plan set forth in and a part of the Comprehensive Plan for the Town of St. John, Lake County, Indiana, as presented and certified by the Plan Commission, is hereby adopted and approved.

SECTION TWO: That the Town Council hereby finds that approval and adoption of the amendments to the Thoroughfare Plan set forth in and a part of the Comprehensive Plan for the Town of St. John, which was certified with a favorable recommendation by the Plan Commission, is in accordance with the provisions of, and criteria contained within, I.C. §36-7-4-500, et seq., as amended from time to time.

FILED
NOV 12 2020
JOHN E. PETALAS
LAKE COUNTY AUDITOR

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SECTION THREE: That a copy of the amendments to the Thoroughfare Plan set forth in and a part of Comprehensive Plan, as presented, is attached to this Resolution as Exhibit A and is incorporated herein by reference.

SECTION FOUR: That all actions be taken to publish approval of amendments to the Thoroughfare Plan set forth in and a part of Comprehensive Plan for the Town of St. John, Lake County, Indiana, and the Town Clerk is directed to file said Comprehensive Plan, as amended, in the Office of the Recorder of Lake County, Indiana, in conformance with I.C. §36-7-4-509, et seq.

ALL OF WHICH IS PASSED AND APPROVED by the Town Council of the Town of St. John, Indiana, this 28th day of October, 2020.

TOWN COUNCIL OF THE TOWN OF ST. JOHN, LAKE COUNTY, INDIANA

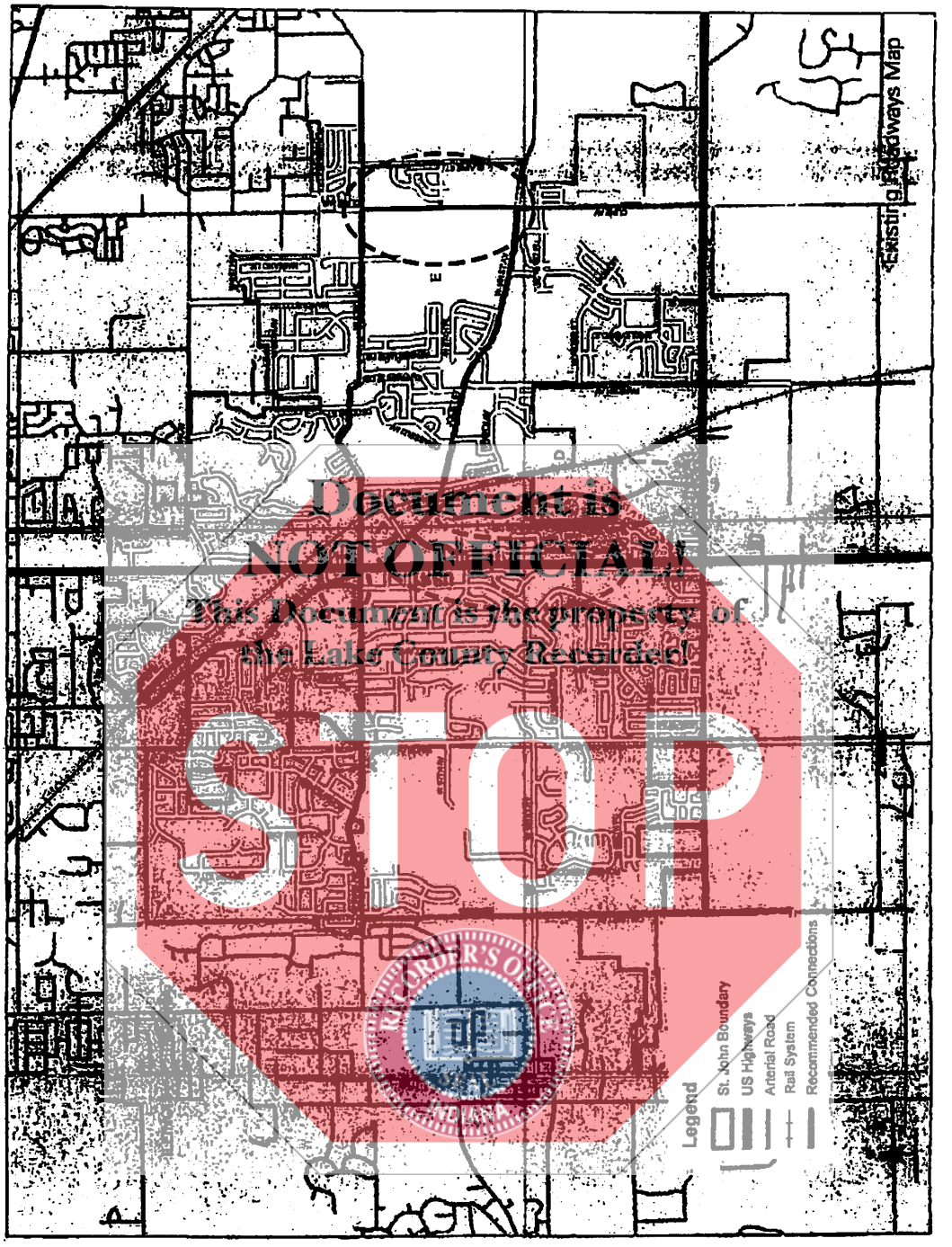
AYE		NAY
	Gerald Swets, President	
	Paul Panczuk, Vice President	
	Wayne Pondinas, Member	
	Michael Schilling, Member	
	Bryan Blazak, Member	

ATTEST:

Beth R. Hernandez

Beth Hernandez, Clerk-Treasurer
Town of St. John, Indiana

EXHIBIT A



JANUARY - 2017

COMPREHENSIVE PLAN

Why Update the Plan?

This is an optimal time to revisit and update the Comprehensive Plan for St. John. Significant changes have occurred since the completion of the 2005 Comprehensive Plan, including extensive residential development; construction of the new police, fire, and municipal facilities; recruitment of high quality retail businesses such as Target, Strack and Van Til, Starbucks, and other restaurants; and transportation improvements along the US 41 corridor. St. John continues to experience significant population growth, associated with a high demand for single family housing. Between 2005-2015 the Town's population grew by 30%. St. John is consistently recognized as an excellent place to live and raise a family. Many new residential developments are being built within the Town boundaries and at the periphery of the Town, obligating St. John to increase land area through annexation. Significant growth in population and land area can pose challenges for the Town to keep pace with expansion of roadways, water and sewer infrastructure, schools and other municipal facilities. This comprehensive planning process is an opportunity to plan for potential growth and to re-visit the Town's primary goal of maintaining and enhancing the quality of life in St. John.

What is a Comprehensive Plan?

A Comprehensive Plan serves a variety of functions for a community, by providing policies and guidelines to enable desirable and appropriate long range development. The Comprehensive Plan is a regulatory tool for local leaders to identify and plan for the physical, economic, environmental, mobility, and aesthetic factors that shape the future growth and development of the Town. The comprehensive planning process provides the opportunity to build consensus through public input and then translate those values into strategic policies for future decision-making, development standards, land use framework, and zoning regulations.

Indiana statute requires that a Comprehensive Plan be adopted by the Plan Commission of the Town, and is permitted by the 500 Series of Title 36-7-4 of the Indiana Code. According to the code, a "Comprehensive Plan should include a statement of objectives for future development, policy for the land use and development of public ways, lands, structures and utilities. It should also consider the survey and studies of current conditions and future growth with maps and other descriptive materials with basic information on locations, extent, demographics and infrastructure."

Acknowledgements

St. John is a community that sets a vision for the future and has consistently and conscientiously planned to bring that vision into reality. The 2015 Comprehensive Plan Update identifies physical, economic, cultural, environmental, and aesthetic issues that support community vitality, growth and success. The Comprehensive Plan was developed through a collaborative process involving Town leadership, residents, businesses, and other community stakeholders. Through a Town wide survey and community meeting, the residents of St. John were engaged and participated in the planning process by identifying the critical issues and offering opinions about the future vision and development goals for St. John.

The Planning team offers special thanks to the following individuals who contributed their time to the development of the 2015 Comprehensive Plan Update for St. John, Indiana:

Economic Development Committee

Nick Georgiou
Rich Setlak
Kelly Stoming
Bill Keith
Steve Kil
Mark Barenie
John DeYoung

Plan Commission

Steve Hastings
Tom Redar
Michael Forbes, President
Derwin Neitzel
Steve Kozel

Utility Board

Gregory Volk, President
Michael Forbes
Mark Barenie
Ken Gembala
Larry Bustamante

Board of Zoning Appeals

Steve Hastings
Paul Panczuk
Ken Scheiher
James Maciejewski, President

Town Council

Michael Forbes, President
Larry Bustamante, Vice President
Mark Barenie, Member
Ken Gembala, Member
Gregory Volk, Member

Other Town Officials and Staff

Stephen Kil, Town Manager
Fred Frego, Police Chief
Chip Sobek, Parks Director
Fred Willman, Fire Chief

Planning Consultants

Solomon Cordwell Buenz
First Group Engineering

Planning Process

The goal of this plan update is to re-evaluate the planning strategies, recommendations and policies to take into account the changes in the Town's population, development market, and physical form over the past decade. The process to update the Plan took place over roughly six months and included regular meetings with Town leadership and Economic Development Committee, site visits, mapping, base data gathering, a community survey, and a Town-wide community meeting. The process was initially focussed on understanding current changes in the community, identifying new planning issues, and establishing current development trends and challenges. These observations were then translated into updated planning goals that outline a future vision, refined recommendations, and policy associated with future development, land use, zoning, and transportation initiatives.

Preliminary planning recommendations were presented to the public at the Town-wide community meeting, providing an opportunity for community feedback on proposed planning policies and goals. Following the meeting, changes were incorporated into the draft based on community comments and concerns. The final plan was then presented to the Town leadership for further review.

The community input provided guidance on key issues including refinement of emerging concepts for future retail and train station developments. Both the extensive community survey and community meeting were forums for understanding the full range of issues, goals, and challenges that need to be considered in St. John's long range planning.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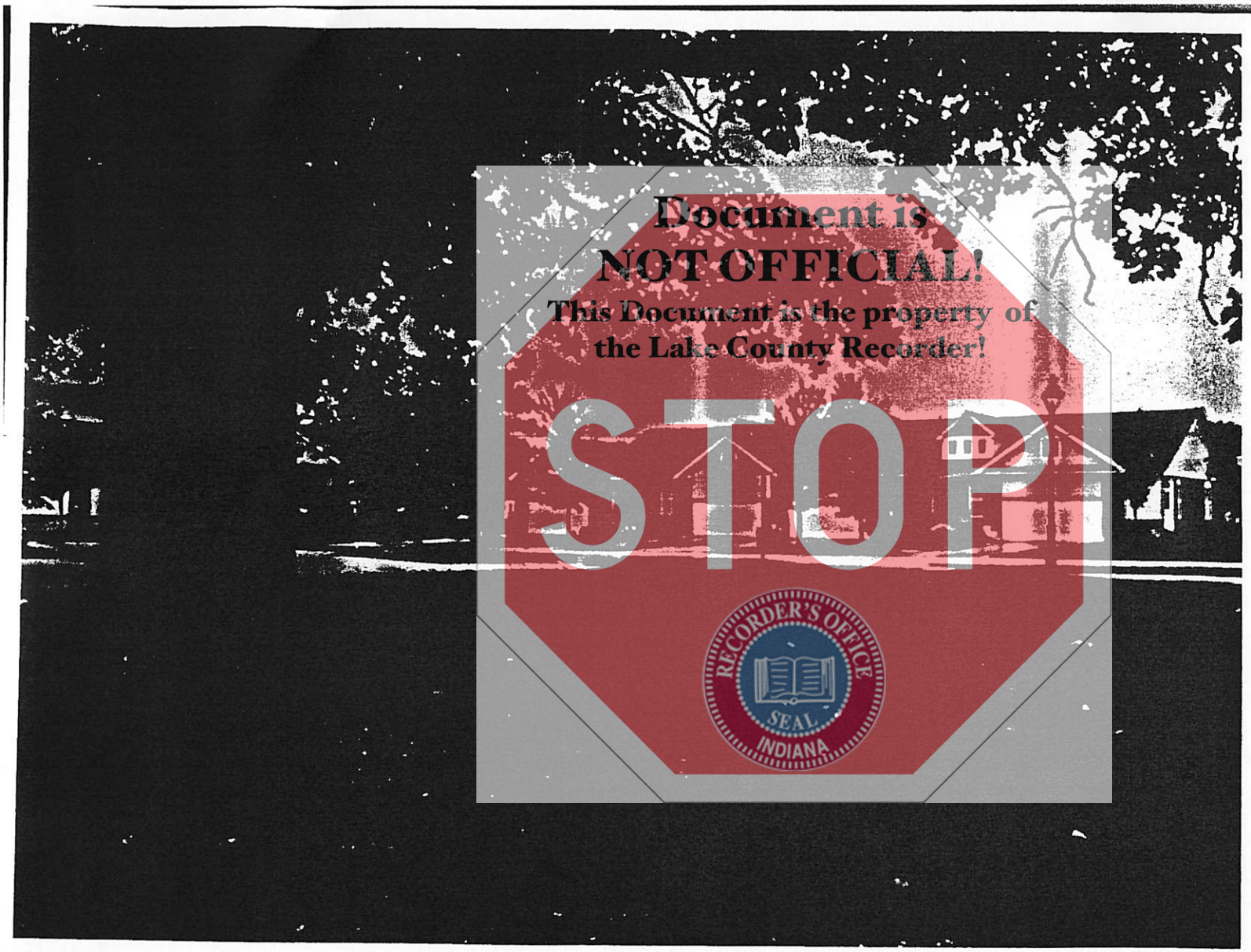
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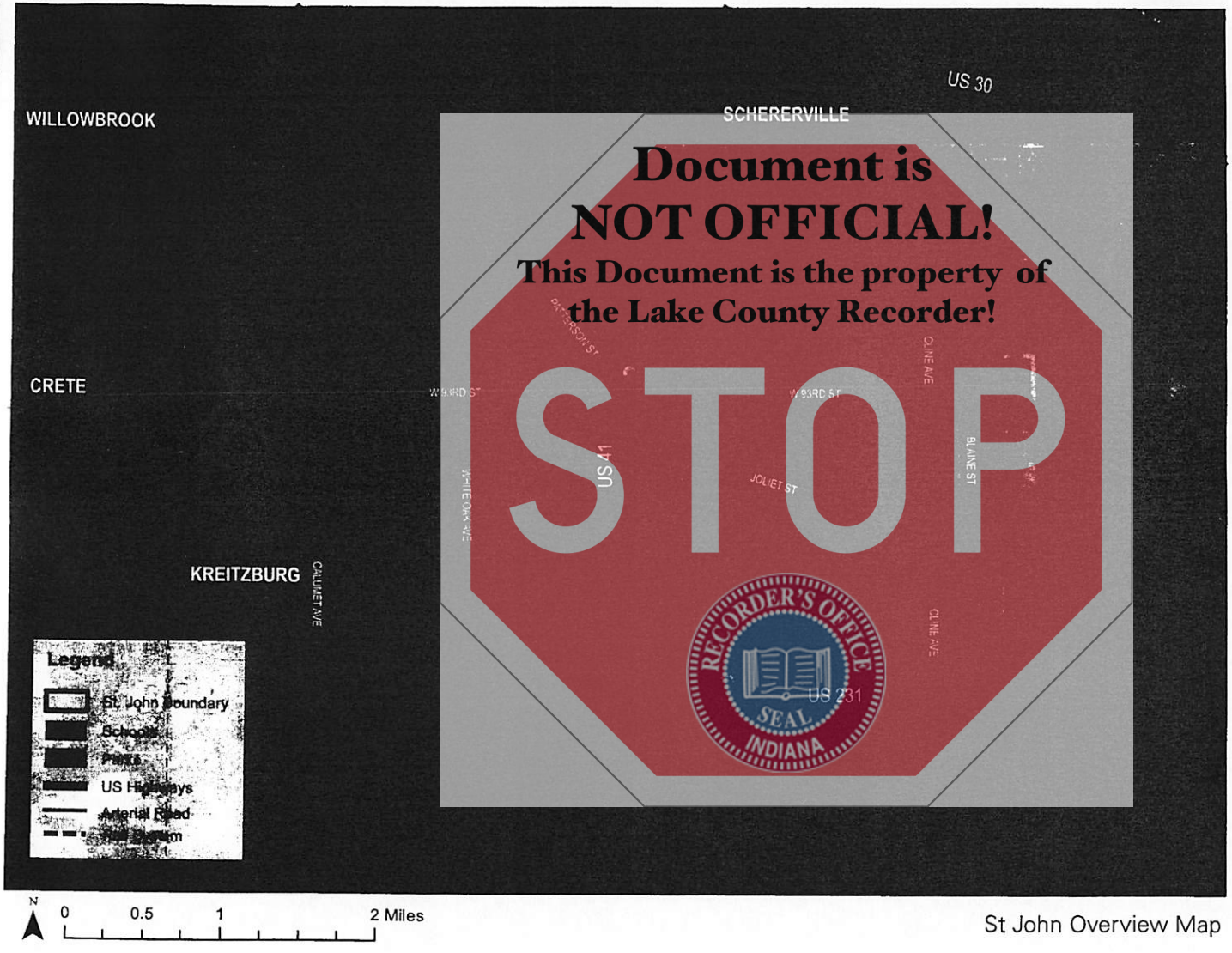
1.0

ST. JOHN TODAY

St. John, Indiana describes itself as a Town of quiet neighborhoods, quality schools, churches, local shops, and extensive parks. The Town benefits from its location near urban employment centers, regional shopping centers, and recreational opportunities including parks, trails, and sports facilities.



St John Overview Map

Location &Transportation

St. John is situated in the northwest corner of Indiana, 40 miles southeast of downtown Chicago. Convenient highway access, to the Town is provided via I-80, I-94, I-65, and the Indiana Tollway (I-90).

Most residents of St. John drive to work and many commute over 60 minutes in each direction. There currently is no rail service in St. John, although many residents commute to rail stations along the Illinois Metra Line and the Indiana South Shore Line. A recent study by the Northern Indiana Commuter Transit District (NICTD) explores the possibility of creating a new commuter train line that would connect St. John, Munster, Dyer and South Hammond to Chicago. Location recommendations and development concepts for the train station are explored further in this plan.

Retail

Since 2005 over 10,000 people have relocated to St. John, tripling the population in 10 years. This substantial population growth has contributed to a greater demand for retail and service businesses. A significant number of people are relocating to St. John from Illinois,the southwest suburbs of Chicago, and other communities in Indiana, increasing the average household income and educational attainment levels of the community. These factors are creating a positive impact to the local economy and are helping to draw national retailers to the area such as Strack & Van Til and Target. There also is a wide assortment of restaurants and smaller stores in St. John, including both national franchises and local businesses.

Most of the current St. John retail businesses are located along the US 41 corridor. In addition, many neighboring communities benefit from the retail expenditures of St. John residents who shop in the adjacent municipalities of Schererville, Highland, Merrillville and Hammond.

Looking forward, there is an opportunity to build off the recent retail success in St. John through additional business attraction of high quality retail and services. Additional retail is currently being considered on the east side of US 41 associated with a new municipal center and along US 231, adjacent to a potential future train station.

Housing

In recent years, St. John has experienced dramatic increases in new single family housing development to accommodate a growing population. Currently 30 percent of the Town's land is zoned for residential and primarily for owner-occupied, single family homes. One of the Town's key goals is to maintain the high quality of life and quiet residential neighborhoods, by thoughtfully managing future residential growth and development.

Municipal Facilities

The municipal services of St. John are located in a recently developed centralized civic center along 93rd Avenue. This complex was constructed in 2007 and houses a 34,000 square foot police and fire station as well as the Town Hall with the Town Council Chambers, Parks and Recreation office, and emergency medical services.

Water Infrastructure & Utilities

Currently, the Town of St. John is updating the municipal utilities and infrastructure master plan to plan for future expansions and keep pace with development infrastructure requirements. Water service today is provided by the Town and drawn from seven municipal wells. The Town does not allow for any new septic systems, and is encouraging the phasing out of existing older septic systems within the Town boundary. Additionally, the Town requires new annexed properties be connected to municipal water and sewer systems. Electric service and natural gas are provided by Northern Indiana Public Service Company (NIPSCO).

Parks & Recreation

St. John has a wide variety of open spaces including three large-scale community parks; Heartland Park, Lake Hills Park, and Civic Park, as well as 22 smaller neighborhood parks and playgrounds. Many of these small municipal parks are located within existing residential developments and are the result of development agreements. The neighborhood parks are spread throughout the town, but needs a comprehensive system of pedestrian/bike connections between them. Many off-street bike trails already exist in the Town, along existing utility right of ways, watercourses, and greenways. The trails are well used throughout the year by both cyclists and walkers, and have become an important amenity for residents of St. John. Additional trail extensions and strategic connections are outlined in this plan to further create a comprehensive network of parks, greenways and trails.

St. John is fortunate to be located in close proximity to regional parks including the LaSalle State Fish and Wildlife Area that offers fishing, hunting, boating, camping, general recreation and access to the Kankakee River and marshes. Lemon Lake County Park provides picnic shelters, food concessions, paddle boats, fishing, tennis and basketball courts, softball fields, soccer fields, hiking trails, an arboretum, outdoor ice skating rink, sledding hill, and cross-country ski trails. Stoney Run County Park has playgrounds, riding trails, a tree nursery, a nature study area and a physical fitness trail. The Indiana Dunes State Park is 25 miles away. There are two privately owned golf courses located near the St. John area that are open to the public.

Schools

St. John is served by the Lake Central and Hanover School Corporations. Each school district entails one high school and multiple middle and elementary schools. In addition to the public school system, St. John is home to several private and parochial schools. There are also several colleges and universities within a short driving distance.

Medical Facilities

St. John is served by a variety of hospitals including St. Margaret Mercy Health Care Centers, located in Dyer; St. Anthony Medical Center in Crown Point, Munster Community Hospital in Munster, and the new Community Hospital Outpatient Center in St. John. Additionally, the Town is well served by medical professionals and specialists, physicians, orthodontists and dentists.

Existing Schools Map

SCHOOLS

5 Crown Point Christian

0 0.5 1 2 Miles

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Demographics

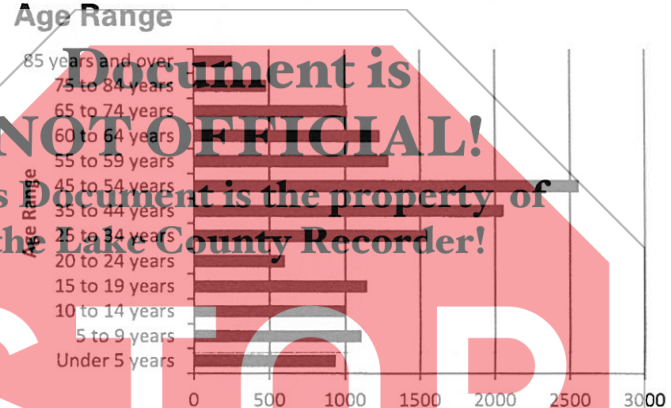
St. John is one of the few places in Northwest Indiana experiencing significant growth in population. Many new residents are moving from the southwest suburbs of Chicago, claiming quality of life as their primary reason to relocate. In 2013, St. John was featured in Businessweek's "Best Places to Raise Kids", and cited as the number one community in the State of Indiana and 15th nationwide. This recognition is attributed to key characteristics such as quality public schools, safety, and the local job market.

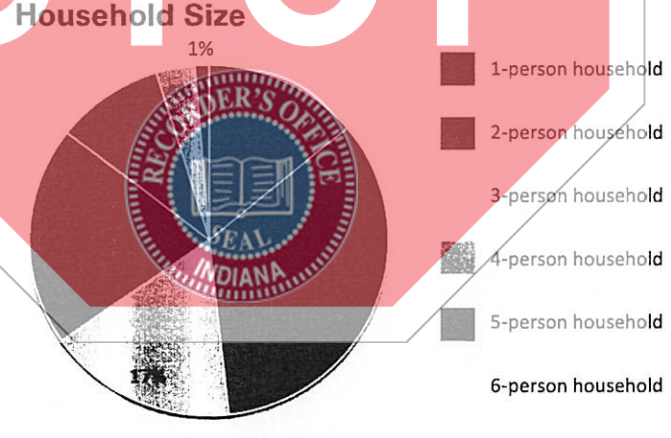
In 2010 the population of St. John was 14,850 and continues to grow annually. Today the population is estimated at 17,000 residents and recent growth projections for the Town are approximately 200 new households per year (based on current Town building permit data).

St. John is uniquely located at the edge of the Chicago metropolitan area and in the path of development growth along the southern shoreline of Lake Michigan. In general, St. John is less populated than its neighboring towns to the north. However, many local farms are selling to residential developers, making the Town a prime location for the construction of single family housing subdivisions. For that reason, St. John will continue to face a steady increase in population and expansion of its Town boundaries in the next decades.

A majority of households in St. John are families, where the head of household is between the ages of 35 and 55. Most of these families are married couples with children under 18 years. Over the years the average household size in St. John has decreased to 2.93 people. The average household income is $103,662, which makes single family home ownership affordable and very attainable. Of the occupied housing units in St. John; 97.1% are owner-occupied and only 2.9% are rental units.

The median age increased slightly between 2010 and 2015 from 38 to 41 years. Looking forward, as the household age increases, it is important that St. John plan for the needs of an aging population.





Summary of St. John Demographics

Population:

- Total population: 16,987 (estimated from Town building permit data)
- Male: 52% (ACS, 2013)
- Female: 48% (ACS, 2013)

Households (ACS, 2013):

- Total households: 5,309
- Family Households: 4,225
- Non-Family Households: 822
- Average household size of the owner occupied unit is 2.93
- Households with individuals under 18 years: 1,925
- Owner-occupied housing units: 4,899
- Renter-occupied housing units: 148
- Median House or condo value $ 248,835

Income:

- Median Household Income $103,662 (Metro 2014 Report)

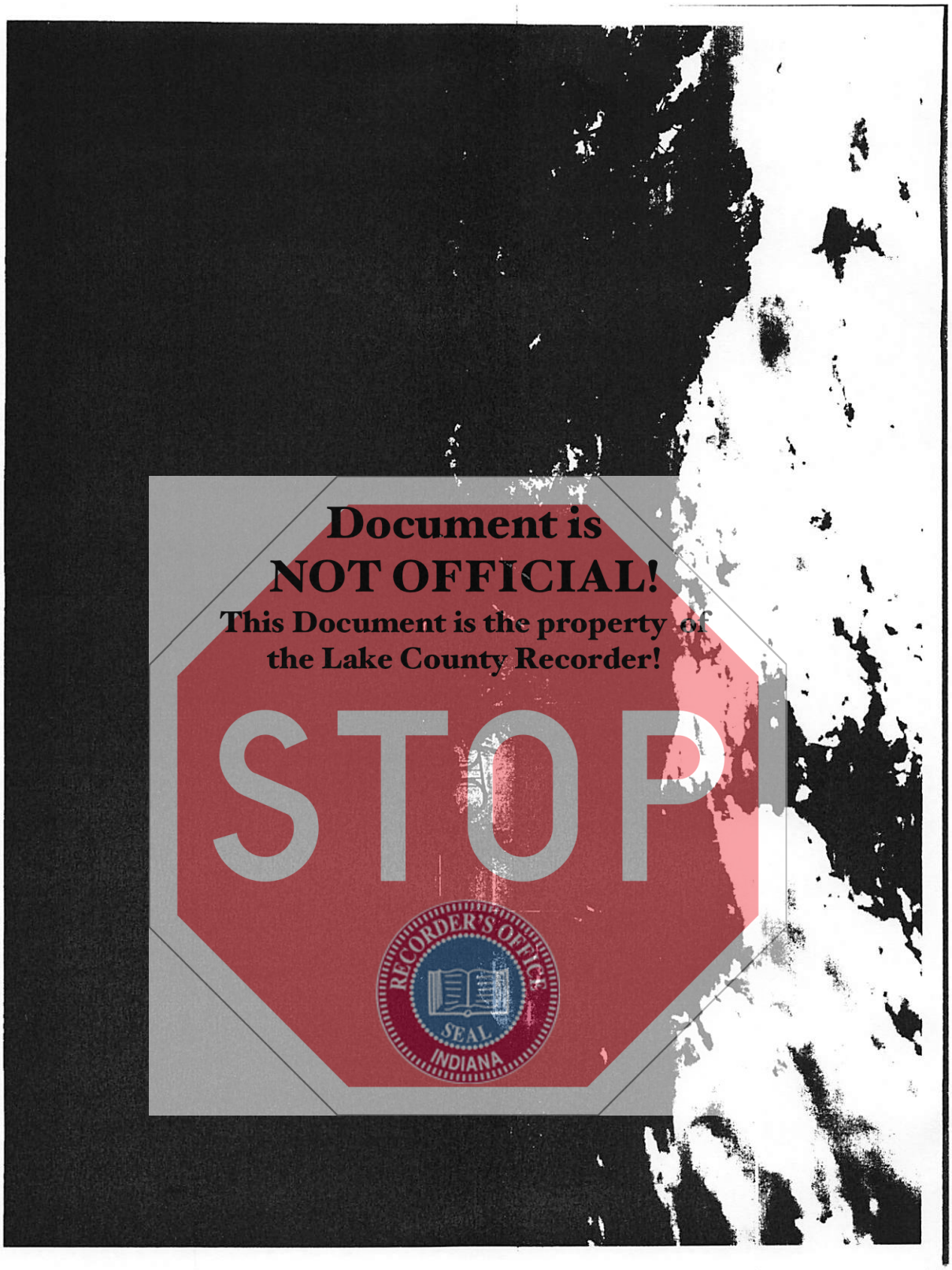
Age:

- Median age (years): 40.9
- Population 65 and older: 1,736

Race (US Census 2010):

- Percentage of Population White: 93.8%
- Percentage of Population African American 1.4%
- Percentage of Population Hispanic (of any race) 8.7%

Race / Ethnicity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2.0 GOALS & OBJECTIVES

This comprehensive planning process is an opportunity to position St. John for sustainable growth, high quality development, preservation of natural resources, improved transportation mobility, and healthy economic development. This will enable St. John to balance short-term development considerations with long term growth potential of the Town. Typically, long-range planning recommendations require decades to be fully realized, therefore it is important to establish the policies today, in order for future generations to continue to enjoy a high quality of life. These planning goals are intended to provide guidance for the next 10-20 years and are the product of community stakeholder and Town leadership discussions.

1. Preserve and Strengthen St. John's Quality of Life and Economic Development:

The primary objective of the St. John Comprehensive Plan is to strengthen and preserve the Town's quality of life through a thoughtful targeted approach to future development that balances St. John's goals with county, state and regional objectives. Currently the Town consists of quiet residential neighborhoods with accessible retail, services, park space, trails and amenities. The Comprehensive Plan aims at preserving and expanding these attributes, while also providing opportunities for future economic development.

2. Provide Guidelines to Accommodate Future Commercial Development and Town Growth:

St. John has significant available land along major highways and arterials for future commercial and retail development. Guidance and oversight of this development is needed to ensure that any future expansion is coordinated to enhance these commercial corridors, provide a high quality identity for the community, reduce traffic conflicts and increase bike and pedestrian safety.

3. Improve US 41 Transportation Accessibility with Pedestrian Intersection Design:

Many new developments are currently being proposed for the US 41 corridor. To avoid future traffic problems, strategic transportation improvements are recommended such as, intersection signalization, pedestrian crossing enhancements, curb-cut consolidation, and extension of the frontage roads. Improved connectivity for pedestrians and cyclist trails is particularly important to the community.

4. Plan for Future St. John Commuter Rail Station:

As St. John grows, a variety of transportation choices should be considered to reduce traffic congestion, expand commuter options, and allow for additional leisure activities for residents. The Comprehensive Plan illustrates a potential for a new commuter rail station in St. John, and conceptualizes transit oriented development surrounding the station. Currently, the Northwest Indiana Transportation Commission is studying the extension of commuter rail in the West Lake County Corridor.

5. Design New Developments to Minimize Traffic Congestion and Provide Better Access to the Highways:

New residential development should be encouraged only in areas where major thoroughfares serving the proposed development can effectively handle the additional traffic that will be generated. The roadways of new residential subdivisions should provide multiple connections to existing roadways, therefore eliminating dead-ends and congestion points.

6. Maintain a Predominantly Single Family Residential Community:

Maintaining single family residences as the primary housing type in St. John is a fundamental community goal and value. However, having alternative housing types for young couples, empty nesters and seniors is recognized as a future need in St. John. A balance of housing options that is reflective of the demographics of the Town is desired.

7. Accommodate Growing Senior Population:

The average age of residents in St. John is trending older which is similar to the surrounding region. Looking forward, the Town will need to address their aging population with additional amenities, housing options, infrastructure, and recreational programming suitable for a growing senior population.

8. Attract High Quality Retail Including Lifestyle Centers and Restaurants:

Additional retail development would increase the sales tax base and help keep household expenditures that are currently being spent in neighboring towns, within St. John. The addition of retail businesses in the Town can also provide part time jobs for younger residents. To help enhance the image of the US 41 corridor, higher quality retail such as "Lifestyle Center" developments are desired. These centers typically include high quality landscape, streetscape, and facade design, as well as offer opportunities for visitors to walk or ride their bike to stores. Specifically, the community would like to see the development of more conveniently located services and sit-down restaurants for residents.

9. Provide Opportunities to Create Businesses and Jobs:

As a growing community, St. John should attract more business development to increase employment opportunities within the community. These business and service uses are desired primarily along the major highway corridors and arterials.

10. Protect Environmental Resources:

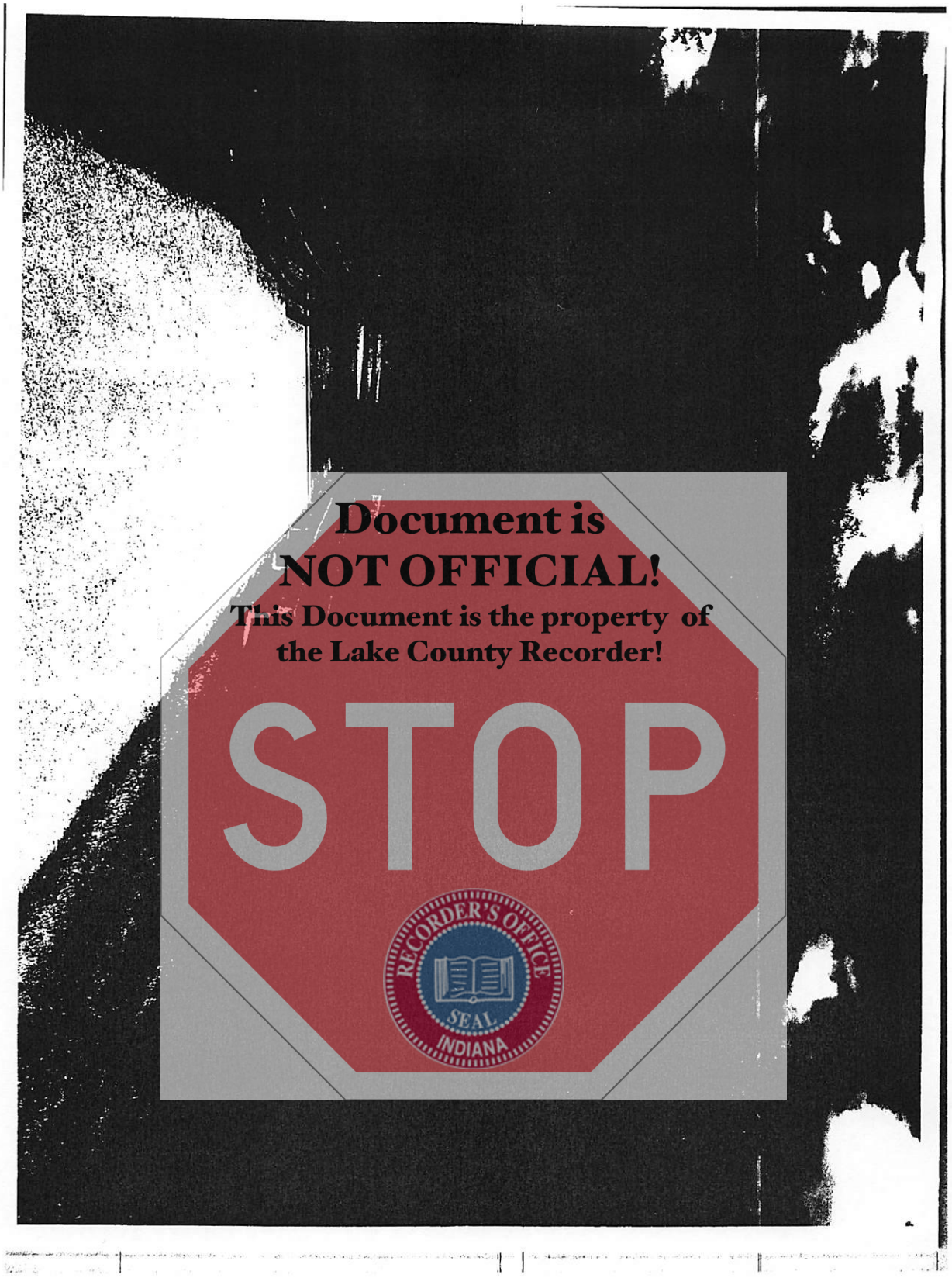
Local wetland areas should be protected and coordinated with regional mitigation initiatives. Stormwater run-off and detention areas need to be designed in compliance with regional stormwater management policy and in accordance with the Town's subdivision control ordinance.

11. Expand and Connect Parks, Trails and Open Space:

The Comprehensive Plan supports the 2014 Park and Open Space Plan recommendations; to develop a connected system of parks, open space, trails and greenway corridors. As the Town of St. John grows additional parks will be sited in strategic locations to serve the new residential neighborhoods.

12. Create a Walkable Civic Center with Retail:

Build off existing municipal center development, adjoining recreational parks and proximity to new retail development on the US 41 corridor, to create an inviting and walkable civic center. Incorporate existing streets, existing buildings, and new streetscape to provide a hometown ambience.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3.0 REVIEW OF RELEVANT PLANS & STUDIES

The 2015 St. John Comprehensive Plan Update builds on the objectives, strategies, and recommendations from relevant St. John and regional plans, which include policies for regional transportation expansion, strategic housing development, job growth, and open space, ecological reserve, sustainability, and quality of life protections.

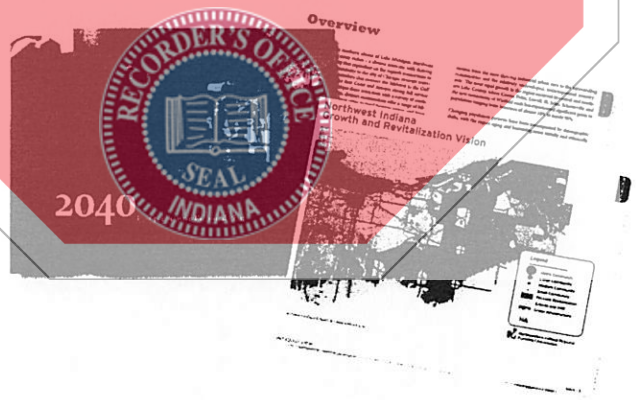
2040 Comprehensive Regional Plan (NIRPC 2011)

In 2008, the Northwestern Indiana Regional Planning Commission (NIRPC) began an extensive planning outreach process to update the Comprehensive Regional Plan (CRP) that provides policy level guidance for Lake, Porter and LaPorte Counties. The planning process included 18 major public workshops and the involvement of numerous community leaders and stakeholders throughout the region. The resulting CRP, adopted in 2011, has a broader vision than previously produced Indiana Long Range Transportation Plans, and includes guidance for land use and development, as well as policies for improvements in transit and regional connectivity.

The plan estimates that the region will increase by over 170,000 people over the next 30 years. Most of this growth will occur in outlying, newer residential communities. The plan recommends that most new development should be directed towards existing urban centers, to encourage the existing urban communities to become more livable and vibrant. One of the primary strategies for achieving this goal is to invest in "Livable Centers". A livable center is defined by the plan as an existing community, with established infrastructure that can support additional infill development growth. The plan identifies these areas as suitable for regional growth, while other more rural areas should be protected. St. John was identified as a Livable Center. The plan also encourages a coordinated expansion of transit and roadway improvements throughout the region to ensure a connected network of future transportation options is implemented in the future. The infrastructure improvements should be coupled with transit oriented land use practices, to encourage greater use of the existing rail system.

The key goals of the plan, relevant to the development around the Livable Center of St. John, are to:

- Provide more transportation choices to reduce household transportation costs and promote public health including expansion of the regional bike trail system, promoting safe routes to school, and complete streets (allow for multiple modes of transportation and land uses).
- Promote equitable and affordable housing by expanding the diversity of housing choices to provide for all income levels, ages and ethnicities. The current median housing price in the region has significantly outpaced income growth.
- Enhance economic competitiveness by expanding employment opportunities and improving access to jobs.
- Support the existing communities through targeted investment in public works projects, focused infill redevelopment of land near the urban core, as well as preserving valuable open space, agricultural land and natural areas at the edges of communities.
- Enhance high quality existing residential communities by investing in infrastructure and amenities that promotes a safe and walkable neighborhood.
- Protect natural areas, water bodies and wetlands from development or harmful pollution, as well as promote the expansion of green infrastructure, sustainable landscapes, and quality site design.



Creating Livable Communities Report (NIRPC 2013)

To implement the policy recommendations of the 2011 Comprehensive Regional Plan (CRP), NIRPC conducted a more detailed analysis of the specific communities identified as Livable Centers in the CRP. The plan identifies the area most suitable to become the Main Livable Center in the community, as well as maps out adjacent amenities, services and transit connections to support growth in this zone. The plan also provides an overview of the existing land use within the Main Livable Center. The recommendations of this Comprehensive Plan Update are in line with this plan, including the creation of a civic/retail center, which is located within the boundary identified by NIRPC as the Main Livable Center.

Water Distribution Master Plan 2001 (update in progress)

The most current water infrastructure master plan was completed in 2001 by NIES Engineering Inc., in coordination with the Utility Board of the Town. The Master Plan recommended improvements to the Town water distribution system through the year 2021. Due to many changes in the size and population of the community, the Town is currently in the process of updating this infrastructure plan. The revised plan is expected to be complete in the fall of 2015.

Parks, Recreation & Open Space Plan 2014-2018

In 2014, a comprehensive analysis of the existing parks and open space system was undertaken by the Town of St. John Department of Parks and Recreation. The resulting Parks, Recreation and Open Space Master Plan includes an inventory of the existing parks, and identifies deficiencies and strategic improvements for the future. The plan acknowledges that the quantity of open space currently meets the national standard for open space per population, but that in discussions with stakeholders the types of parks and programming should be improved to better meet the needs of the residents.

The key goals/strategies identified by the Plan to address future open space needs are:

- Connect both existing parks and future developed parks by a comprehensive system of off-street bike trails. This system will link with other existing regional trails including the Veteran's Memorial Bike Trail and the Penn Central Corridor Trail. Creating additional linkages, with a focus on key community destinations will provide more recreational opportunities for residents and help to ensure that St. John is a safe place for cyclists. Several opportunities for trail expansion were identified in the Plan:
  - Use existing stormwater drainage corridors to locate new trails.
  - Add trails to existing utility easements throughout the Town.
  - Require new developments to incorporate trail connections, where feasible.
- Continue to enhance existing recreational and athletics facilities at Heartland and Patnce Parks, by adding additional amenities such as a community multi-purpose building to house parks and recreational programs.
- Expand cultural programming for parks, to incorporate additional community events, concerts, art fairs, and seasonal programs.
- Improve signage, marketing and programming of the parks to encourage greater use.
- Create a maintenance and funding plan for upkeep of a rapidly expanding park system.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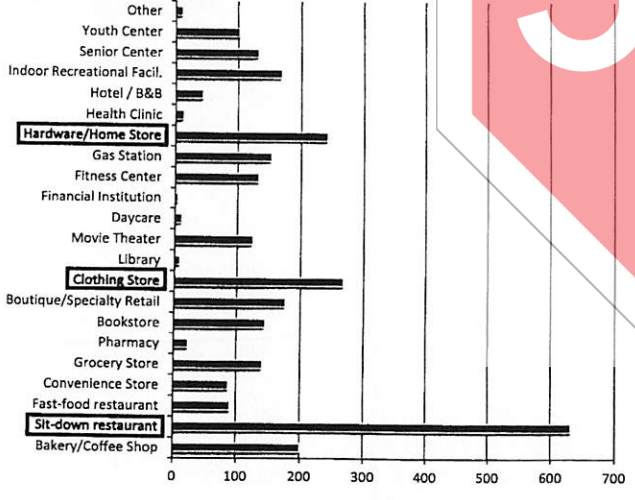
4.C COMMUNITY OUTREACH OVERVIEW

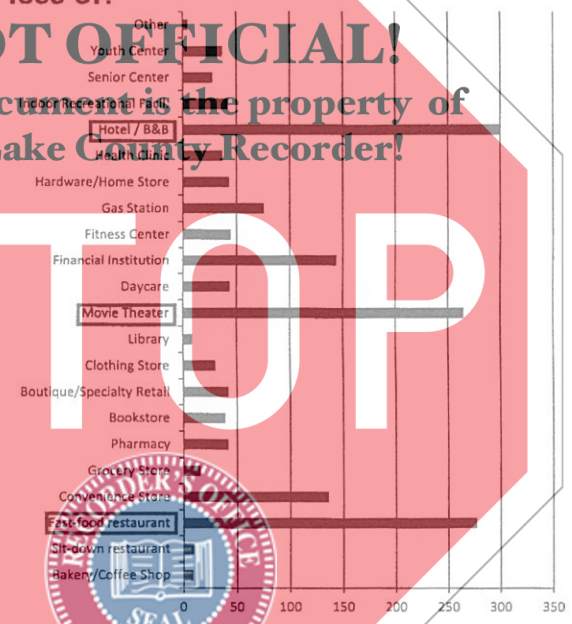
In developing this Comprehensive Plan for St. John, public involvement is critical to establishing a shared future vision for the Town. In order to engage the community with this planning process, residents were invited to participate in a community wide survey and attend a community meeting where data, issues, and planning recommendations were described in depth. The presentation was followed by a discussion session where the planning consultant team and Town officials were present to answer any questions, address community concerns, and record preferences.

78% of survey participants are in favor of a new mixed use shopping area that would serve as a "Downtown" or "Town Center" of St. John.

What type of stores would you like to see more of or better quality? (highest preference shown in box)



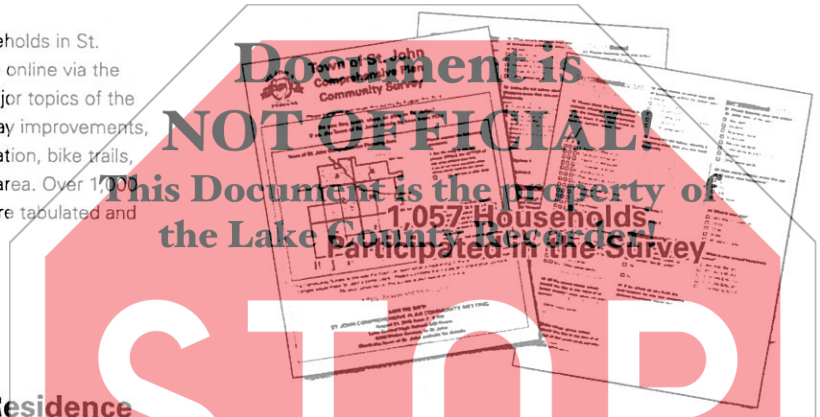
What type of stores would you like to see less of?



What would increase your use of businesses within St John?

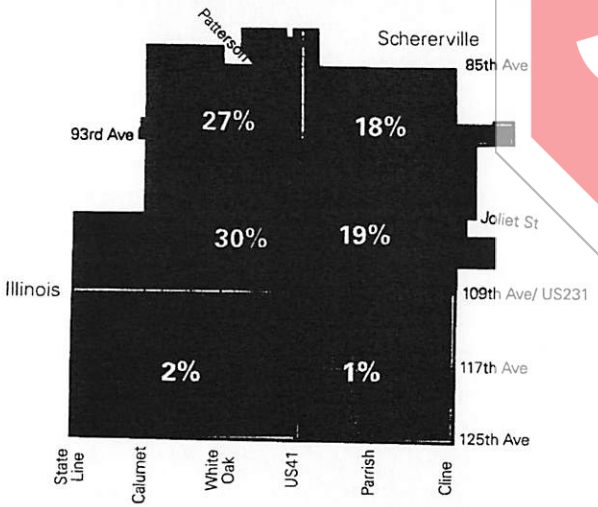
Community Survey Results

A detailed community survey was distributed to all households in St. John through mailing of the water bills, and was available online via the Town's website. The survey covered questions on the major topics of the Comprehensive Plan including: transportation and roadway improvements, quality of life, retail opportunities, housing choices, recreation, bike trails, open space, a new Town Center, and future train station area. Over 1,000 households completed the survey. Survey responses were tabulated and are summarized below.

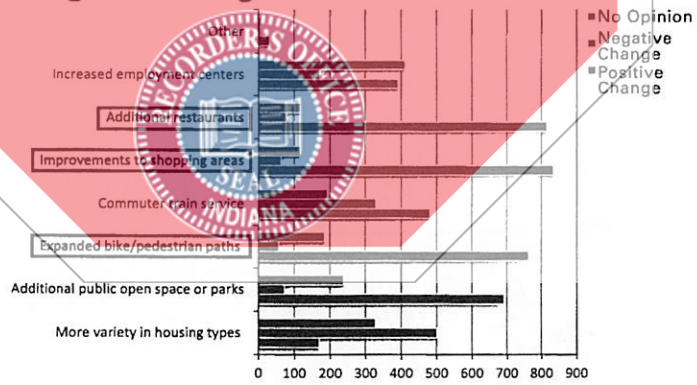


1,057 Households Participated in the Survey

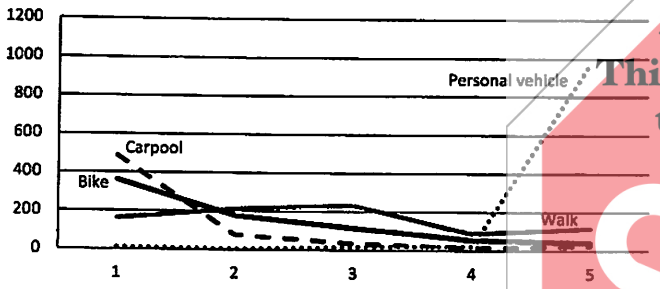
Survey Participant's Location of Residence



Would these improvements be a positive or negative change?

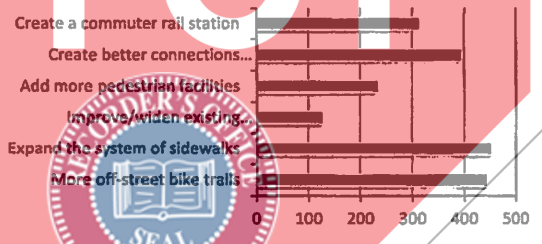


How often do you use the following types of transportation?

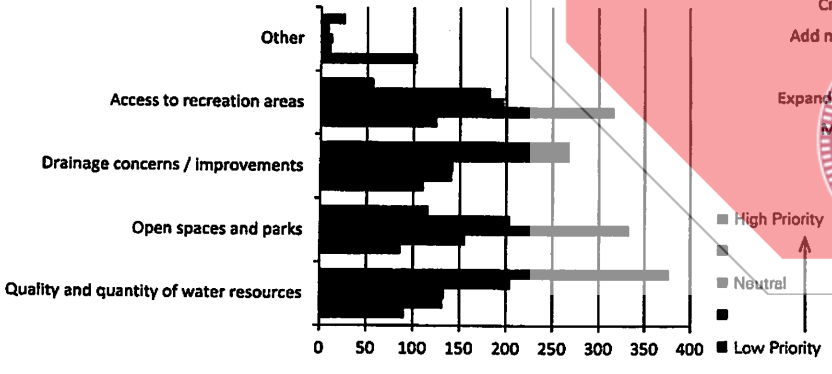


Which of the following roadway system elements need improvements?

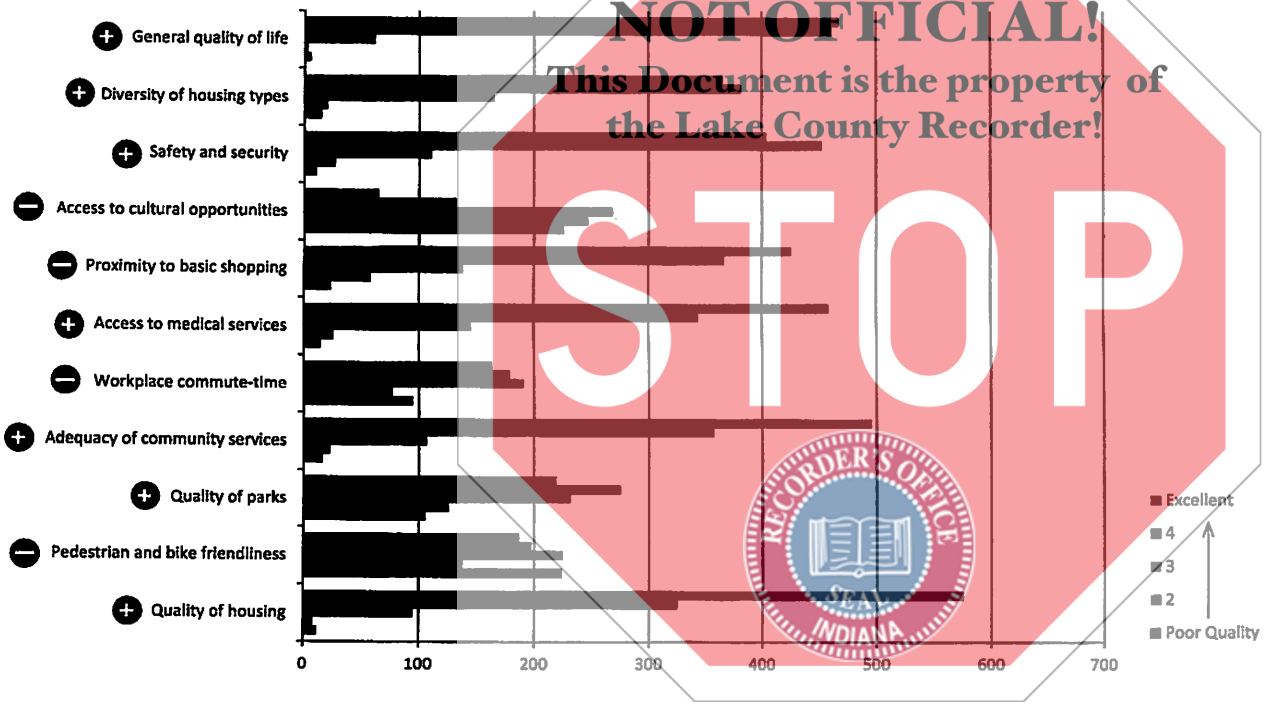
What other improvements should be made to the transportation system?



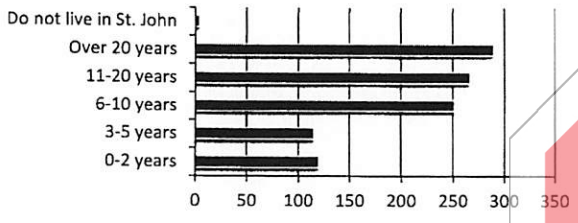
Prioritize the following issues



Rate the area in which you live for the following categories.

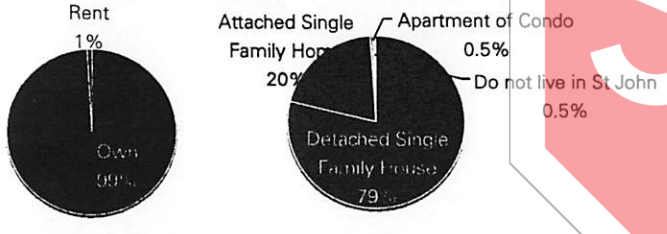


How long have survey participants lived in St John?



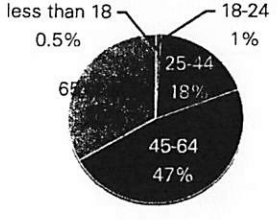
Annual household income of participants

Survey participants household type

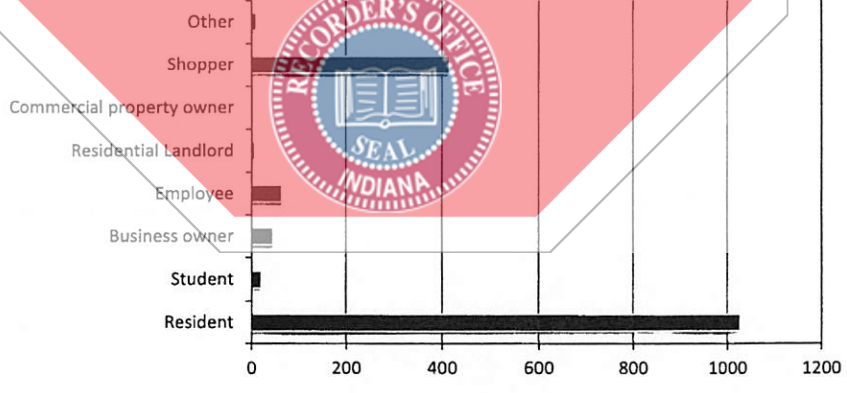


Number of children under 18 in participant households

Ages range of participants



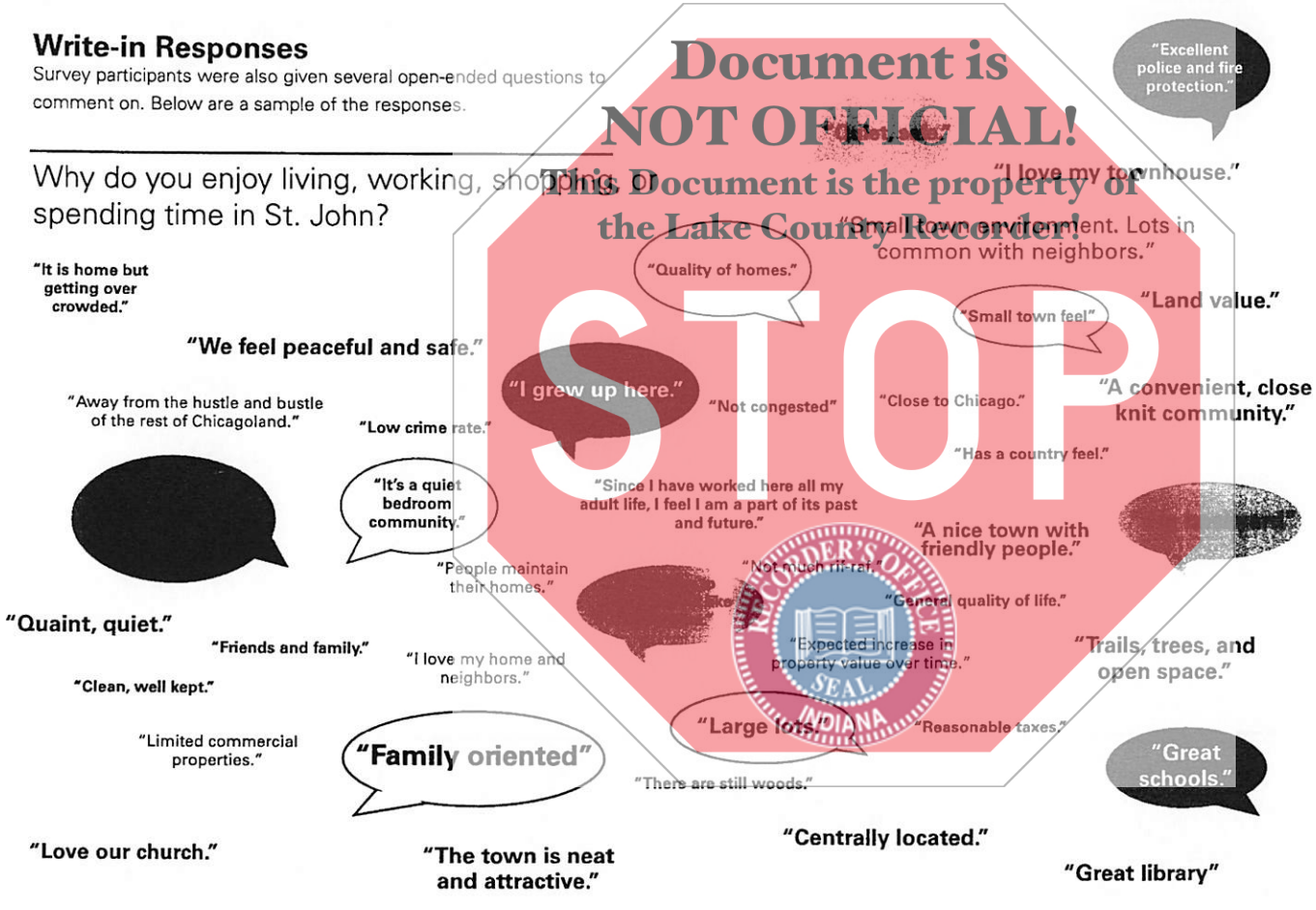
Participants' roles within St John



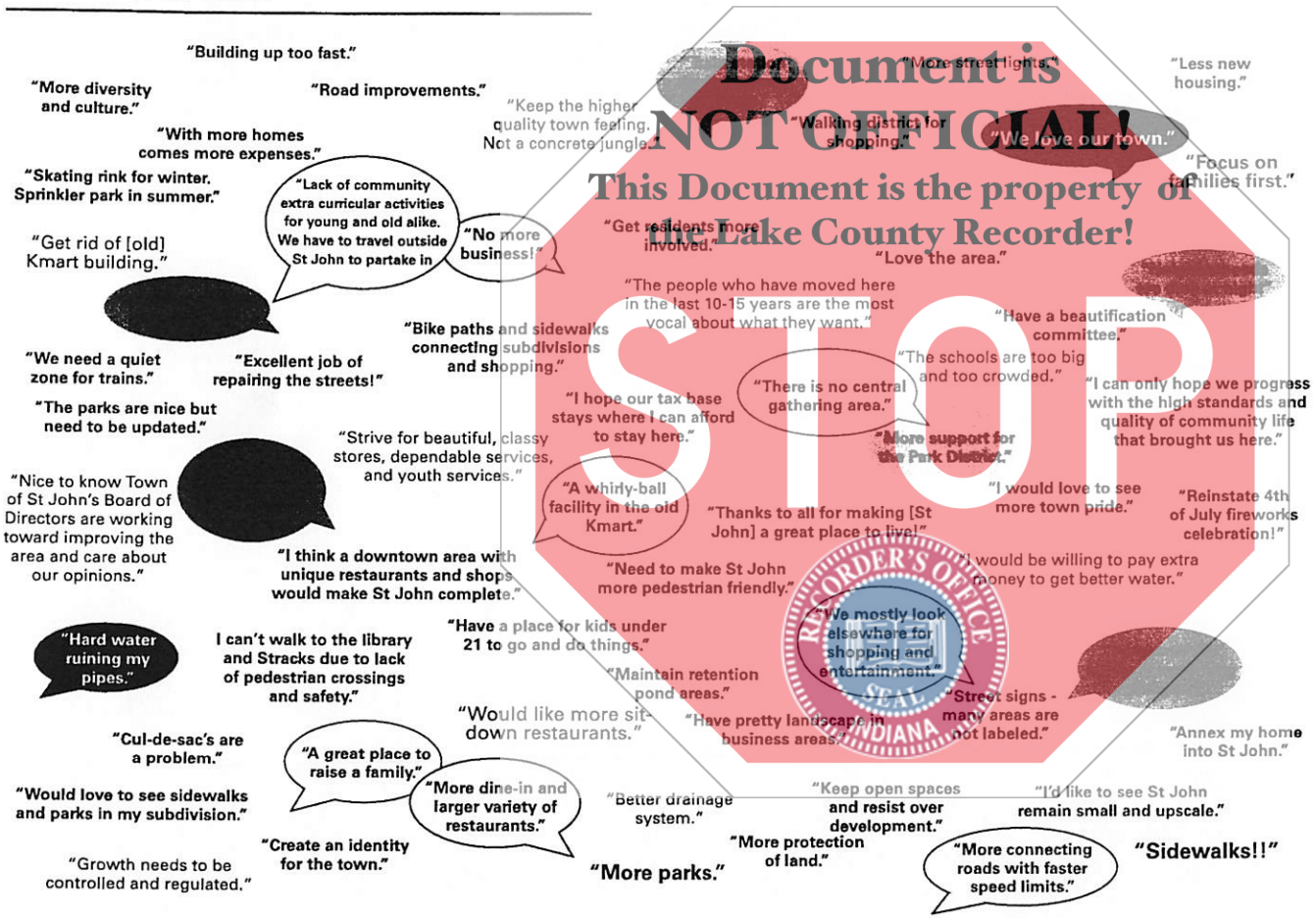
Write-in Responses

Survey participants were also given several open-ended questions to comment on. Below are a sample of the responses.

Why do you enjoy living, working, shopping, or spending time in St. John?



General Comments

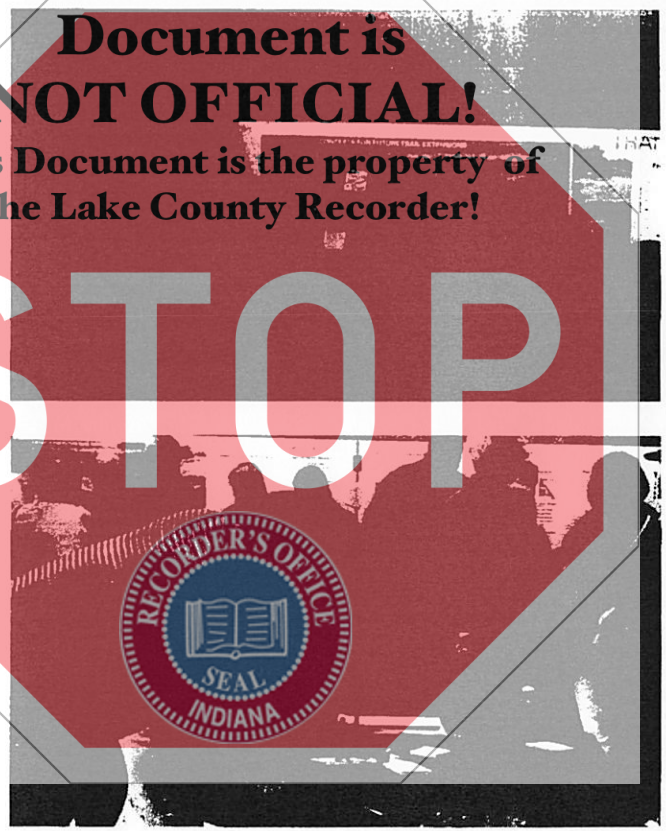


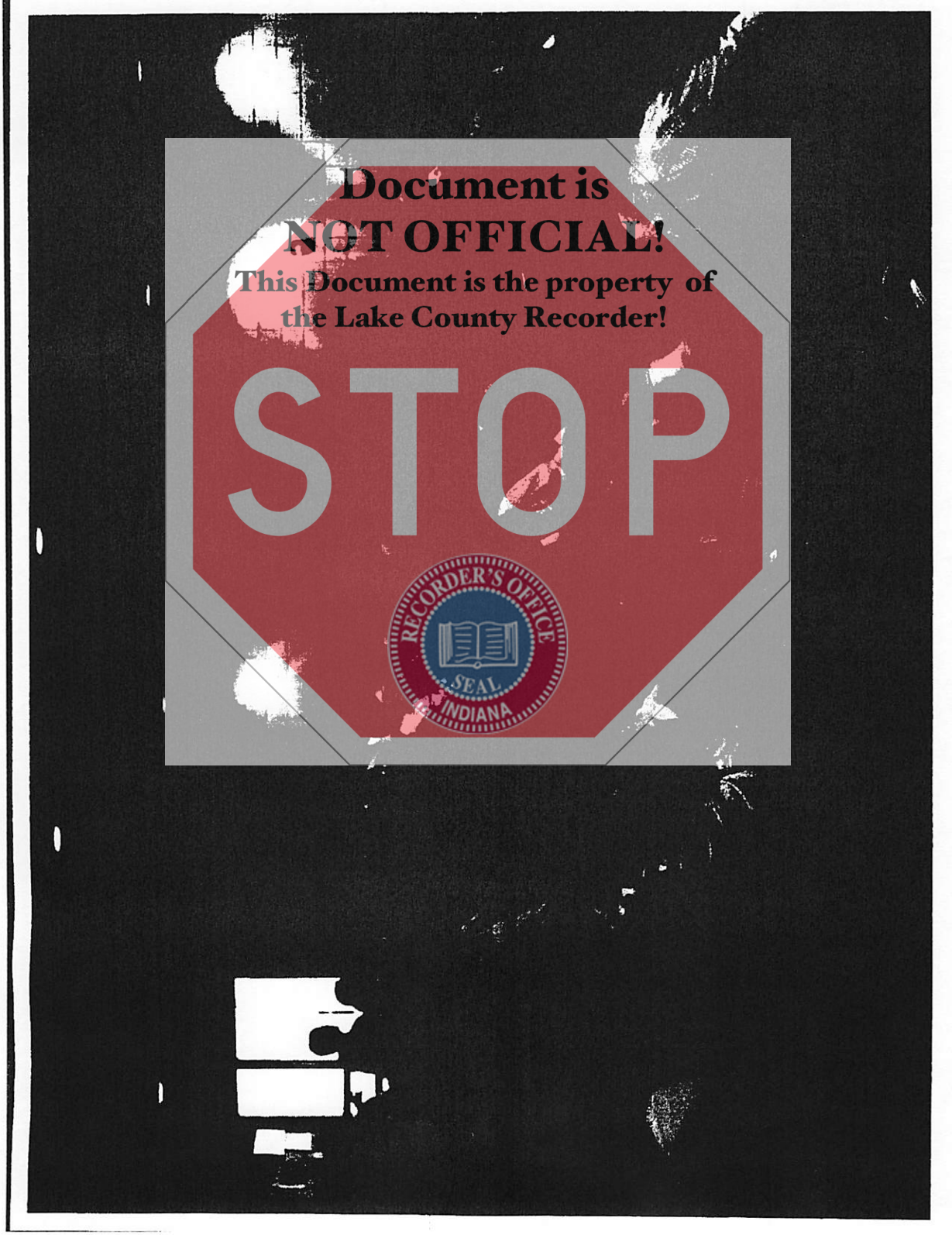
Community Meeting

On Monday August 31, 2015 a community meeting was held at Lake Central High School to provide an opportunity to discuss the Comprehensive Plan goals, future policies, and concepts. Over 100 people attended the meeting. The planning team led by SCB and Town officials provided an overview of St John's growth since the completion of the previous plan in 2005. Other key topics included a summary of community survey results, land use issues, an overview of proposed US 41 roadway improvements, and ideas for a new civic/retail center and train station development. The presentation was followed by an open forum for discussion and questions. The following are some highlights of community comments:

- A more continuous sidewalk network is desired by residents, especially to connect the east and west sides of US 41, and along 93rd and Joliet Street.
- Residents living in the Joliet Street area expressed concern that a Town Center concept will require demolition of some of the property and historic character in the area. In response, a new concept should consider a smaller scale with infill developments that preserve existing homes.
- Residents who live near 93rd Street and US 231 are concerned about growing traffic congestion along those roadways as new residential developments are built adding more cars to existing roadways. In response, the project transportation engineer analyzed key intersections for potential impacts.
- Participants wanted to know what is planned for the old Kmart site. Town leadership noted that the site is under control of an investment firm that is seeking to lease the property, however the proposed new intersection may be a catalyst for future property redevelopment.

- A concern was raised about the proposed six traffic signal lights along US 41 increasing traffic congestion. Planners noted that these proposed intersection improvements would help alleviate traffic conflicts and increase public safety for both vehicles and pedestrians. At this time these intersections are being studied and the Indiana Department of Transportation, will be making any final roadway improvement recommendations.
- Residents noted that US 41 is very dangerous and the location of a number of recent fatal and serious traffic accidents. Residents identified the Joliet Street left turn as one of the most dangerous intersections. This intersection is currently being studied for safety improvements.
- Participants noted that sidewalks along US 41 are discontinuous, and residents should be able to walk between retail centers located on the same side of the street.
- Many residents noted the importance of the walking or biking trails, and the need to continue to expand the trail system to connect throughout the community.
- A desire for more retail and especially sit-down restaurant options was reinforced by many community meeting participants.

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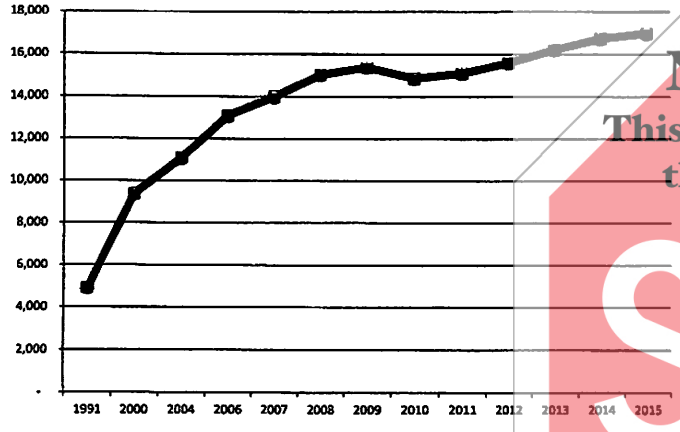
5.0 ACCOMMODATING THE PROJECTED GROWTH OF ST. JOHN

Over the past several decades, the regional population growth in Northwest Indiana decreased in the northern industrial cities of Gary and Hammond and shifted towards the suburban communities to the south. Many people have relocated in St. John to take advantage of lower taxes, competitive housing costs, quality schools, and proximity to employment in the Chicago metropolitan region. As a result, the Town of St. John has grown significantly. With this continuous development pressure, many neighboring towns are quickly reaching their build out capacity, which is fueling a steady increase in demand for residential development in St. John.

Population Growth Projections



According to the 2010 census, St. John's population increased 56% between 2000 and 2010 and outpaced the growth of other municipalities in the region, and statewide growth.

The Northwest Indiana Regional Plan Commission (NIRPC) provides regional growth projections to support future transportation and mobility, roadway, and infrastructure plans. NIRPC estimates that Lake County will grow from 496,005 people to over 620,000 in 2040 (CRP, NIRPC 2011).

Current residential building permits issued in St. John indicate that growth has slowed slightly as compared to 2000-2010, but continues to increase at a steady pace. An average of 218 building permits were issued between the years of 2005-2010, and an average of 138 annual permits have been submitted for the last five years (2010-2015). This slight decrease in development activity reflects the economic downturn from the recession. With the recent economic rebound, the community is currently experiencing an upswing in development activity, with the proposal of several new large scale residential developments, future annexations, and commercial development along the US 41 corridor. Based on the current growth, it is projected that St. John will continue to grow and annex new land to the south and west. If steady population growth continues, St. John is projected to grow to over 35,000 people, by 2040 (based on Town of St. John building permit data).

Annexation Planning Boundaries

With the current growth trends in the region, St. John will experience more pressure to annex additional land area. By State law, St. John has the ability to annex areas that have 1/8 of their boundaries contiguous to the Town. Considering the boundaries of the neighboring towns of Dyer, Schererville, Crown Point and Cedar Lake, there is a tremendous amount of unincorporated land, especially to the south adjacent to St. John.

St. John considers the following factors for annexation:

- Current Town boundary
- Utility and service areas and capacity
- Neighboring Town boundaries and unincorporated lands
- Environmental boundaries
- School district boundaries
- Illinois-Indiana state line

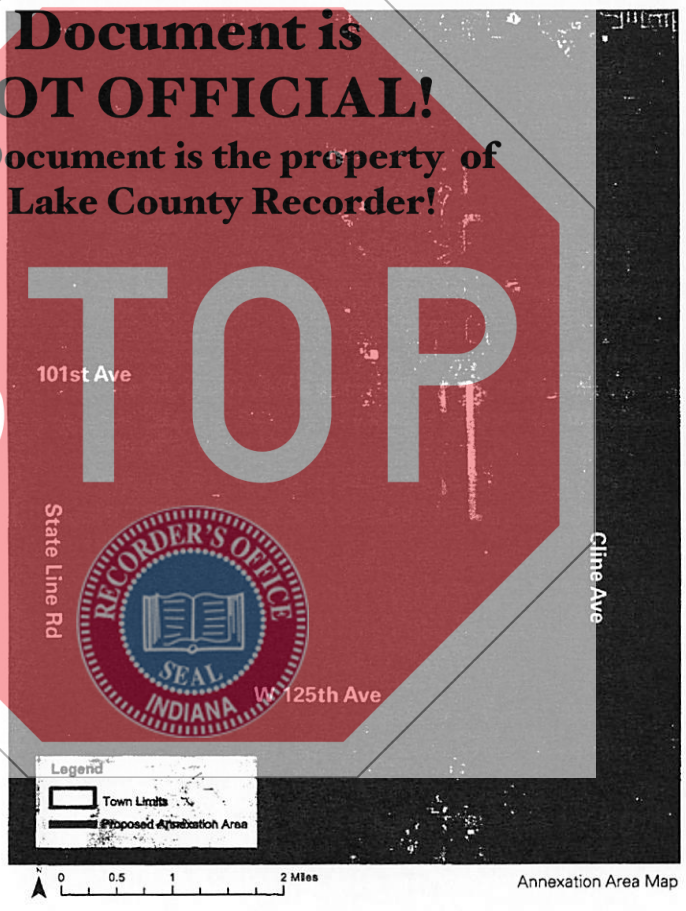
The anticipated future annexation boundaries include the Illinois/Indiana state line to the west, Cline Street to the east, and 125th Avenue to the south. The proposed southern boundary will require further coordination with the Town of Cedar Lake.

Through an analysis of the current zoning and land use conditions and extrapolating the population growth of St. John, it is possible to project potential growth scenarios for the Town. Consideration of environmental and infrastructure policies should be set to ensure proper growth and maintenance of St. John's current quality of life and Infrastructure standards.

Policy Recommendations for Annexations

The following list outlines planning policy goals for unincorporated land under consideration for future annexation by the Town of St. John.

- Review population increases for impacts on school age population, school locations and district boundaries.
- Outline development requirements for potential annexed areas to meet the objectives of the Comprehensive Plan and other Town policy, including, land use, zoning, water & sewer and roadway construction requirements.
- Provide guidelines to preserve wetland areas and other natural resources and encourage park land and open space to be accessible to new residential areas.



Annexation Area Map

PHASE I

TOTAL AREA OF BUILD OUT: 3,915 ACRES

PHASE II

TOTAL AREA OF BUILD OUT: 3,150 ACRES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6.0 TRANSPORTATION & ACCESS

In planning for the development of any town or city, the role of transportation is extremely important and, in many cases, the critical factor in determining whether a town is prepared for managing significant growth. It is vital to fully understand the potential ramifications of the accelerated expansion that St. John is experiencing and plan accordingly. Whether it is the improvement of an intersection or the planning for a commuter rail station, it is essential that these capital expenditures are identified as early as possible and strategies to address key issues are included in the Comprehensive Plan.

Existing Roadways Map

Overview of the Thoroughfare Plan
(see complete document in the appendix)

The coordination of land use and thoroughfare development is critical to provide safe and efficient access for the residents of any community. Proper access planning for commercial areas, especially along a major corridor such as U.S. 41 affects quality of life issues for residents within a community as well as those traveling through St. John.

The following are recommended actions resulting from the Thoroughfare Plan (see the full analysis in the appendix):

- New developments on the various classifications of streets should have the required Right of Ways, (noted in the Thoroughfare Plan) dedicated at the time of Planning approval.
- The west approach of 93rd Avenue to US 41 should be widened to lengthen the left turn lane to approximately 320 ft.
- Access to US 41 should be consolidated wherever and whenever the opportunity presents itself through re-development of existing properties.
- Due to many recent traffic accidents, the Town would like to add a bi-directional center turn lane along the entire length of US 41 to create a safe place for accommodating left hand turns. Indiana Department of Transportation (INDoT) has jurisdiction over the highway and is currently studying a center turn lane along the north segment of US 41 from Lake Central Avenue to Schererville, IN. However this does not impact the key intersections in St John and the Town is requesting INDoT study future phases to extend the center turn lane along US 41 to 93rd Street and then a subsequent phase to US Route 231.
- Frontage roads or cross access between properties should be required wherever possible to allow for traffic to move from development to development without having to us US 41.
- New residential sub-divisions should be linked to adjacent sub-divisions. Sub-divisions located on arterial or collector streets should not have direct driveway access to those streets but rather by way of the internal street system.
- Access to U.S. 231 between Parish Avenue and Cline Avenue should be limited to full access at Park Place and right in/right out between intersections. 60 ft or half right of way should be required of all new developments in this area for future roadway improvements.

Specific linkages are recommended for improved circulation. These are illustrated in the map to the left and include:

A. White Oak Avenue from West 93rd Avenue to Monfort Drive and a crossing connection of West 90th Avenue from Olcott Avenue to Franklin Drive

B. Patterson Street – new connection to West 93rd Avenue west of existing intersection (at Keilman Street)

C. US 41 Frontage Road from approximately West 93rd Avenue to West 105th Street and West 103rd Street from Bull Run Drive to US 41

Existing Zoning Map

7.0 LAND USE & ZONING

Preparing a comprehensive plan provides an opportunity to globally review the town's zoning to determine whether the current land uses and zoning meet the Town's future development goals. The map on the facing page shows the current zoning map for the Town. The St. John Zoning Ordinance supplements the map to define specific zoning classifications, allowable land uses, parcel densities, setbacks and other development regulations. In 2006, the zoning ordinance was substantially updated and adopted by the Town. The St. John Plan Commission and Town Council are responsible for reviewing individual requests for changes to zoning and annexation on a parcel by parcel basis.

Residential Uses

(R1, R2, R3)

St. John is primarily a residential community, with 73% of the land area dedicated to residential development and only 27% to all other non-residential uses.

Commercial Uses

(C1, C2)

Most retail and commercial uses are concentrated along US Route 41. These areas make up 7% of the total land area of St. John, and are distributed relatively equally on both sides of this major regional highway. There is additional commercial use zoned along US 231, to support the small retail along this emerging commercial corridor.

Light Industrial

(I)

St. John has a decreasing demand for industrial uses within the Town, and therefore only 1% of the total land is currently zoned for light industrial uses. These parcels are primarily located along, and between the rail lines where industrial uses are best suited.

Public Lands

(P)

5% of the land area of the Town is zoned as public land. This category includes both parks and municipal facilities. Public land and facilities are currently equitably spread throughout the Town, due to the continuous acquisition of public land with the development of new residential subdivisions.

R2
34%

R1
32%

Open Space

(OP)

Only 13% of the land in the Town remains as open, natural, undeveloped land. Much of the future development in the Town will occur in new annexed properties at the edges of the Town boundary. A majority of this existing open space is attributed to wetlands, creeks and other sensitive natural areas.

Land Use Issues & Recommendations

Existing Residential Uses

Low density single family residential is the predominant housing type in St. John, which is consistent with adjoining communities. The Town offers few townhouse, duplex, or multi-family housing options. A wider variety of housing types were built since 2004, however the demand for a more diverse housing stock continues to grow in the region. Singles, young couples, empty nesters, and seniors are seeking more diverse housing choices and price points.

Of the residential zoned land, 90% is currently zoned for low-density single-family homes.

Residential Development Today

Current trends in residential development include Planned Unit Development (PUD) districts which offer a variety of housing options, ranging from single family homes to town homes/ duplexes. These districts are regulated and reviewed based on site plan approval and allowable percentages of single family residential, duplex, cluster homes, and townhouses. Several of these PUD's are currently under construction in newly annexed areas of St. John and are very successful. The PUD process encourages residential developments to be planned as individual high quality, livable neighborhoods, with an integrated network of streets, trails, waterways, and open spaces. St. John will continue to encourage high-quality new residential developments, by annexing adjacent land to accommodate residential growth.

Residential Recommendations

The following is recommended to help maintain the attractive residential neighborhoods that are the core of St. John, while also preparing the Town for future housing needs:

- Continue to encourage the development of single family residential developments that provide adequate transportation connectivity, open spaces, trails and amenities to attract new long-term residents.
- Encourage a mix of housing types including well-designed owner-occupied townhouses, senior housing and duplex homes.
- Require that all multifamily housing adhere to standards to ensure that new units adhere to; good construction standards, high aesthetic quality, inclusion of owner occupied units, and are appropriately located.
- Maintain quiet residential streets with low traffic volumes that provide safe places for children.
- Where possible incorporate and build bicycle/ pedestrian trails in residential developments to provide recreational opportunities for residents.

Land Use Issues & Recommendations

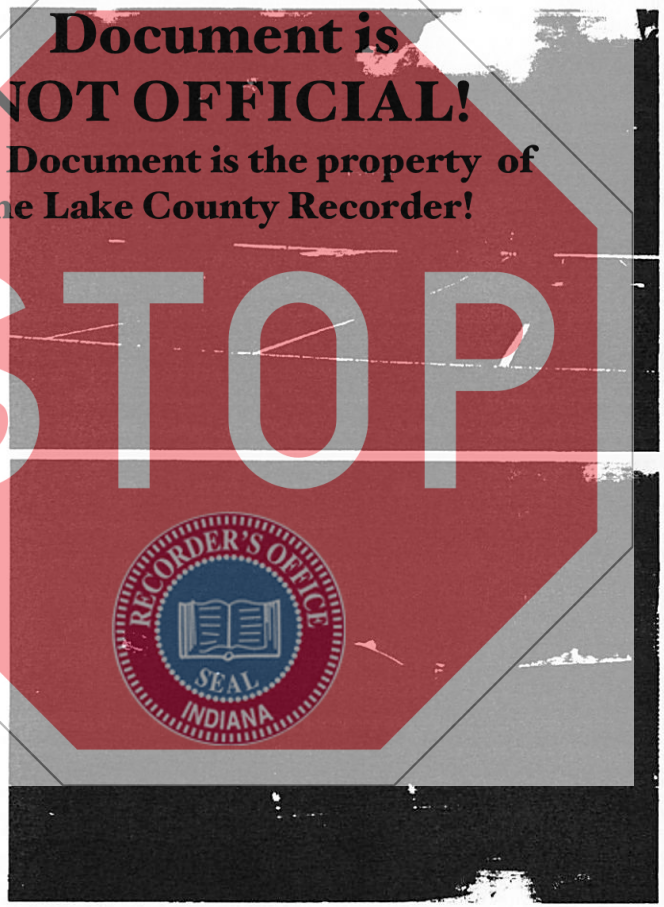
Commercial / Retail Development Trends

US Route 41 serves as the primary commercial corridor for St. John, however a few commercial developments are located east of US 41, along US 231 (109th Avenue). There continues to be new and substantial commercial development along both of these major vehicular corridors.

Recently, larger scale retailers such as Target and Strack & Van Til have built stores along the US 41 corridor, which has spurred additional outlot-style retail development. These retailers draw shoppers from St. John as well as surrounding communities. To alleviate traffic issues associated with these major retailers, frontage roadways were built (as recommended in the 2004 Comprehensive Plan). The frontage roads help to reduce the need for curb cuts along US 41, and define a narrower zone of land that can accommodate smaller outlot developments or landscaping. In addition to these frontage roadways, intersection improvements are recommended to provide a better traffic flow, improved vehicular, and pedestrian safety. Transportation improvements associated with this type of retail continues to be an important issue related to commercial development in St. John.

Commercial Recommendations

- Enforce retail design guidelines and landscape requirements to ensure that development along the commercial corridors is high quality and aesthetically consistent.
- Continue to require coordination of frontage road locations and limit curb cuts to maintain traffic flow and safety.
- Establish a downtown overlay district to allow for mixed use (residential and commercial) adjacent to the existing municipal complex and to encourage the development of an identifiable downtown civic/retail area for St. John.



Land Use Issues & Recommendations

Light Industrial Recommendations

A majority of the Industrial land is located adjacent to or in between the railroad embankments. This land is difficult to access and is not easily expanded. The rail embankments provide a natural separation that buffers residential from these industrial uses.

The following are recommendations for future light industrial development:

- The demand for light industrial space in St. John is currently very low. Existing industrial businesses should remain, however extensive expansion of industrial uses is not recommended.
- Light industrial land that is undeveloped in the center of the Town should be considered for other uses.
- There is currently Light Industrial zoned land adjacent to the municipal complex which is better suited for retail, professional office or other municipal facilities, in the future.

Professional Office / Business Recommendations

The creation of small-scaled professional offices along the US 41 corridor is desired by the community to establish a balance of land uses. Expanding office and business uses in the community will encourage future job creation, benefit the local economy, and expand the Town's commercial tax base. As the Town grows, new areas for business office uses will be identified. Typically office land uses are complementary to adjacent commercial and residential uses .

Municipal Facilities

St. John's municipal complex is located off of 93rd Avenue and includes the Town Hall, Police and Fire Station, and the Public Works facility. This complex was constructed in 2007 and designed to support a population of up to 50,000 people. These facilities have adequate capacity to serve St. John's future growth. The complex houses a 34,000 square foot police and fire station as well as the Town management offices, Department of Public Works, Parks and Recreation, and Clerk Treasurer's offices..

Land Use Issues & Recommendations

Open Space, Trails and Wetlands

Prior to the settlement of St. John this land was primarily wetlands, marshes, and prairie. However, much of St. John's original natural geography was transformed by farming and development, with a few remnants of these natural areas still remaining today. These natural areas are valuable community assets that provide opportunities for parks, pedestrian walkways, and bicycle trails.

The Town is physically divided by the Continental Divide. Bull Run Creek and the St. John Creek, combine to form West Creek, which drains into the Kankakee River watershed. The creeks north of the Town drain into the Lake Michigan watershed. Bull Run Creek is controlled by the Lake County Drainage Board, which has established a 60-foot protection zone from the center line of the creek. The watercourses of the Bull Run and West Creek are platted with easements, which provides the opportunity for these and other drainage courses to become part of a future open space network and trail systems.

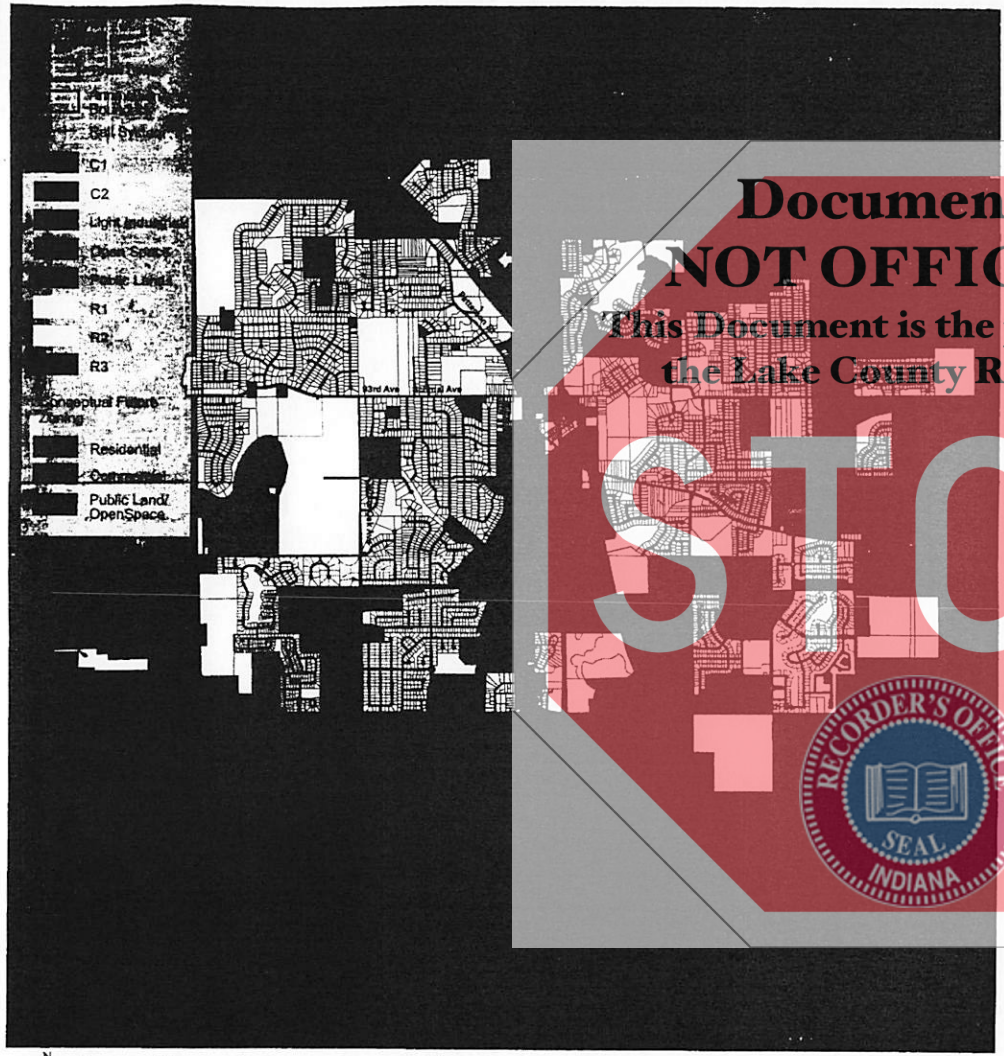
The utility corridors that cross St. John are another opportunity for creating an integrated trail network. Recent expansion of regional trails in neighboring communities provides opportunities for St. John to connect with the regional trail and greenway system in Northwest Indiana.

New annexed land, and new residential developments are required to adhere to the goals of the 2014 Parks, Recreation, and Open Space Master Plan which includes recommendations for trail connectivity. The Town requires new developments to include off-street bike trails, and create trail connections to the existing network where feasible.

The Town will continue to promote these initiatives to preserve existing green spaces or wetlands and to incorporate natural areas in the site design of new developments.

Open Space and Trails Recommendations

- Identify and protect wetlands from development
- Create portions of the Town's Bicycle/ Pedestrian Trail as part of new developments, focusing on key connections to existing trails.
- Encourage development techniques that minimize the percentage of impermeable surfaces and allowing for natural drainage.
- Participate in a local storm water management program that is compliant with the storm water management policies regulated by the State, County, NIRPC, and federal agencies.
- Work with developers to strategically locate and elicit cooperation in preserving substantial natural landscape features such as wetlands, mature trees, stream valley buffers and wildlife habitats.
- Encourage subdivision planning (for RC-1 zoning) that clusters development to conserve and restore natural resources. These green corridors can be a great neighborhood amenity.
- Create opportunities to connect the natural resources of St. John through "greenways" and hike / bike trails.
- Encourage pedestrian activity and safety through sidewalks, intersection improvements and trail connections.
- Identify opportunities to connect trails in St. John to northwest Indiana's regional trail systems, and coordinate with NIRPC and neighboring communities to identify opportunities for expanding these trail networks.

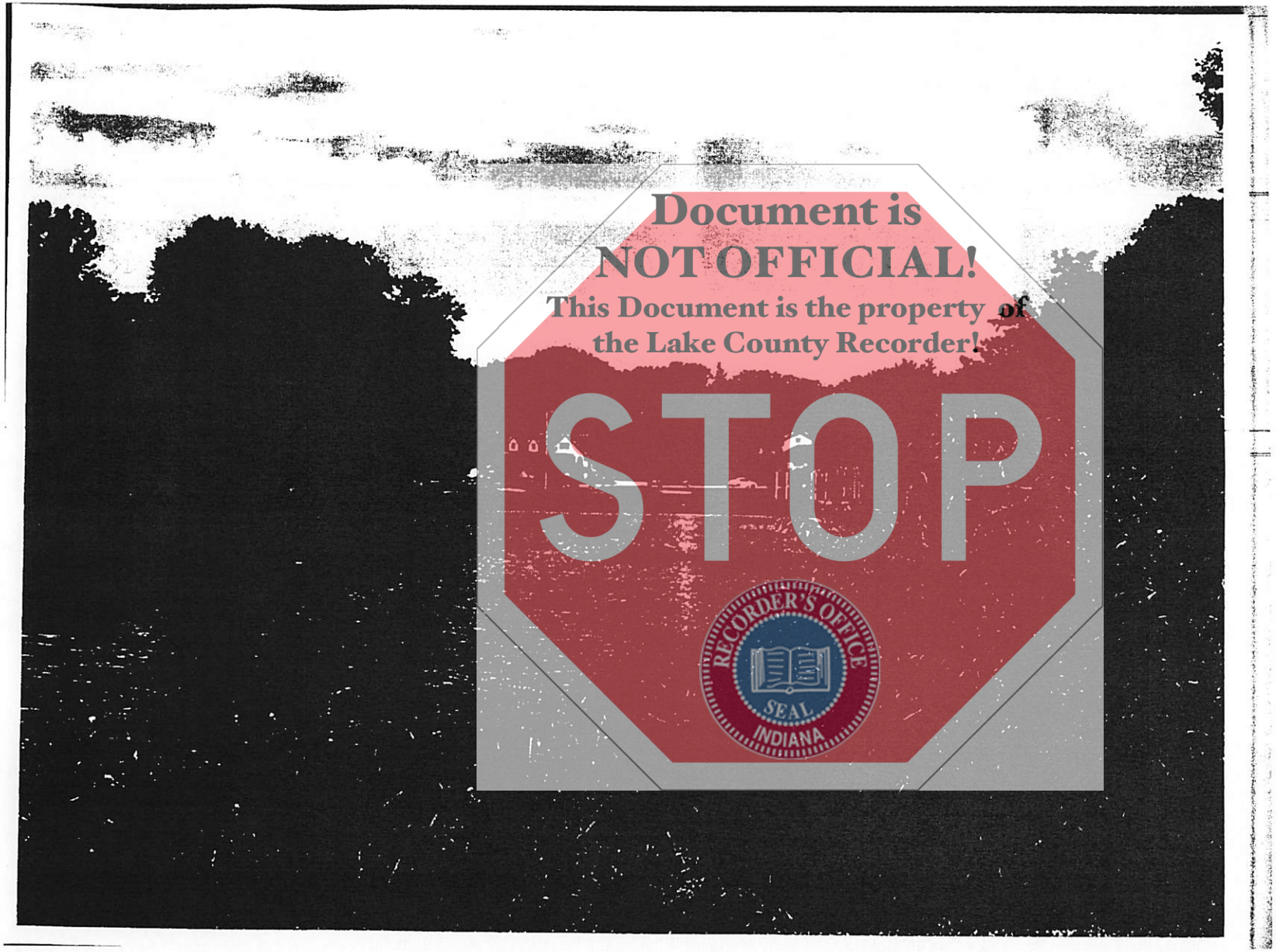


Future Zoning Map

Zoning of Annexation Areas

As future Town growth occurs, balancing the mix of uses, and their locations will be important to future success. As shown in this diagram, the pattern of existing uses in the Town should be extended to the south as land is annexed, using the following strategies:

- US 41 and US 231 should continue to be the primary location for retail developments in the Town. The existing depth of retail parcels should be extended south as new land is annexed to allow for the existing pattern of outlots and frontage roads to continue.
- Natural areas, wetlands, forested areas, and bodies of water should be protected as new growth occurs. Plans for new parks, recreational areas, and trails should continue to be explored as new developments are proposed. Furthering the connected system of open spaces and trails is critical to quality of life and recreation.
- Residential uses should provide a mix of housing types and styles to support the growing population of the Town.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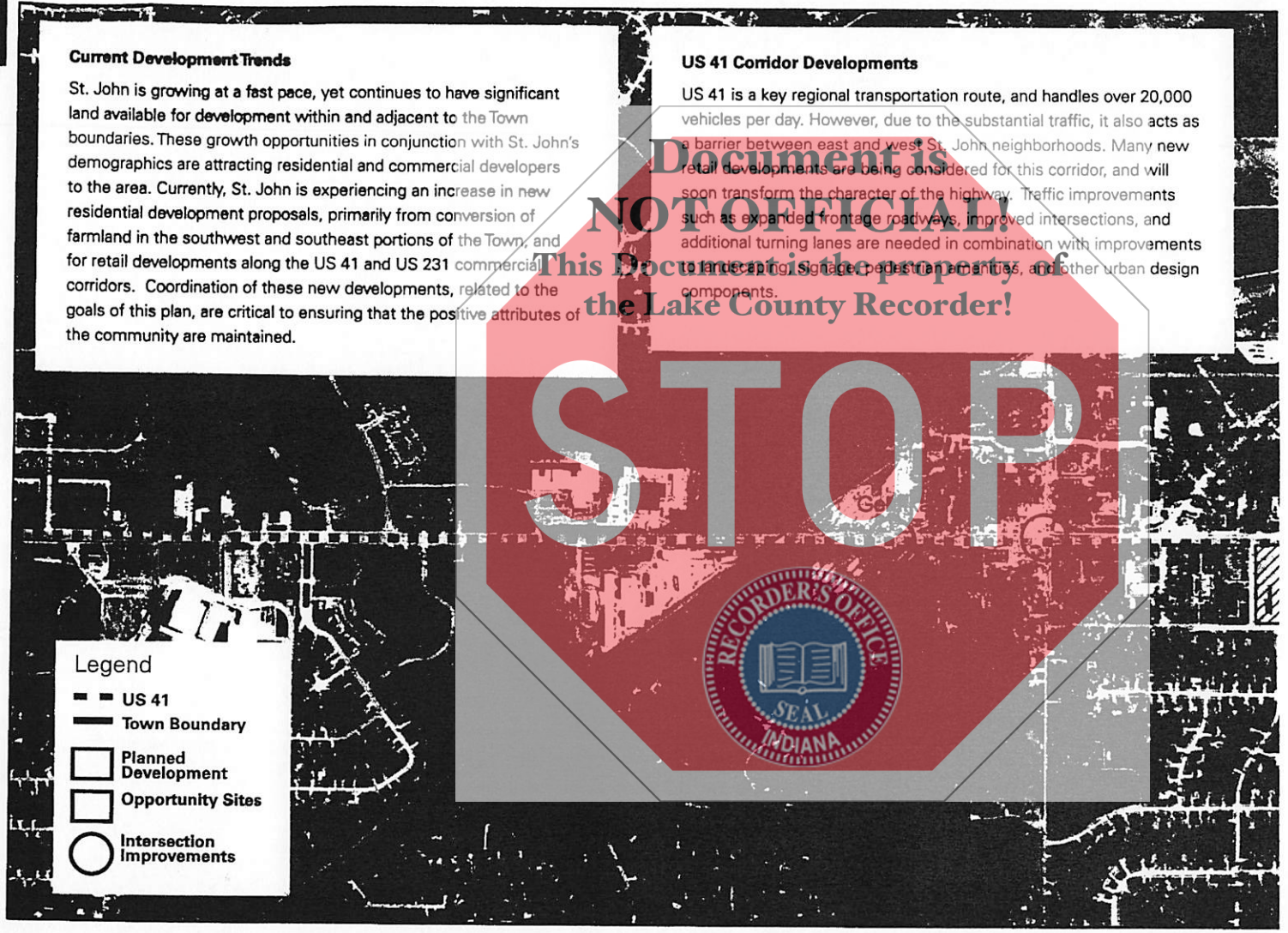
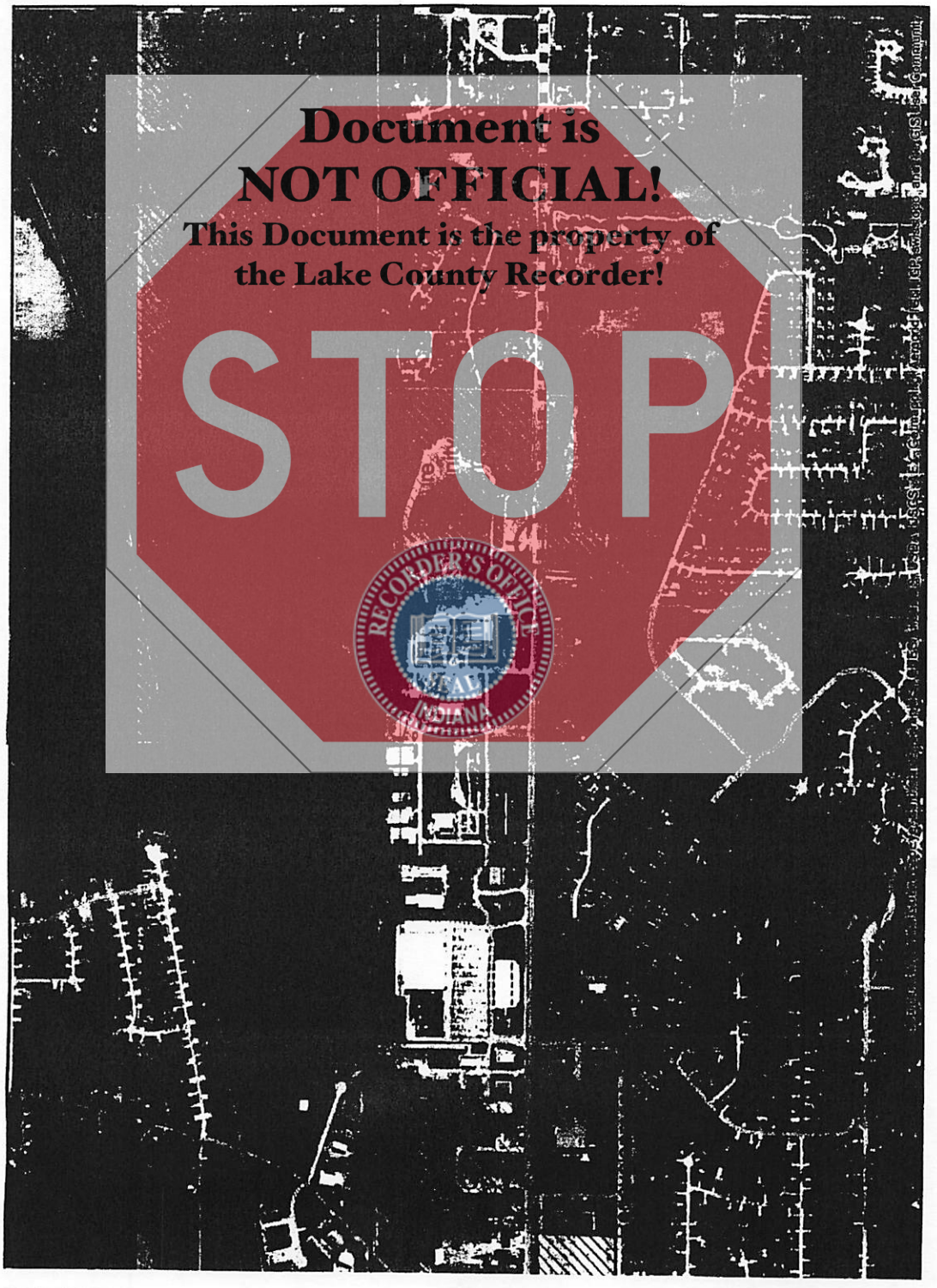
Current Development Trends

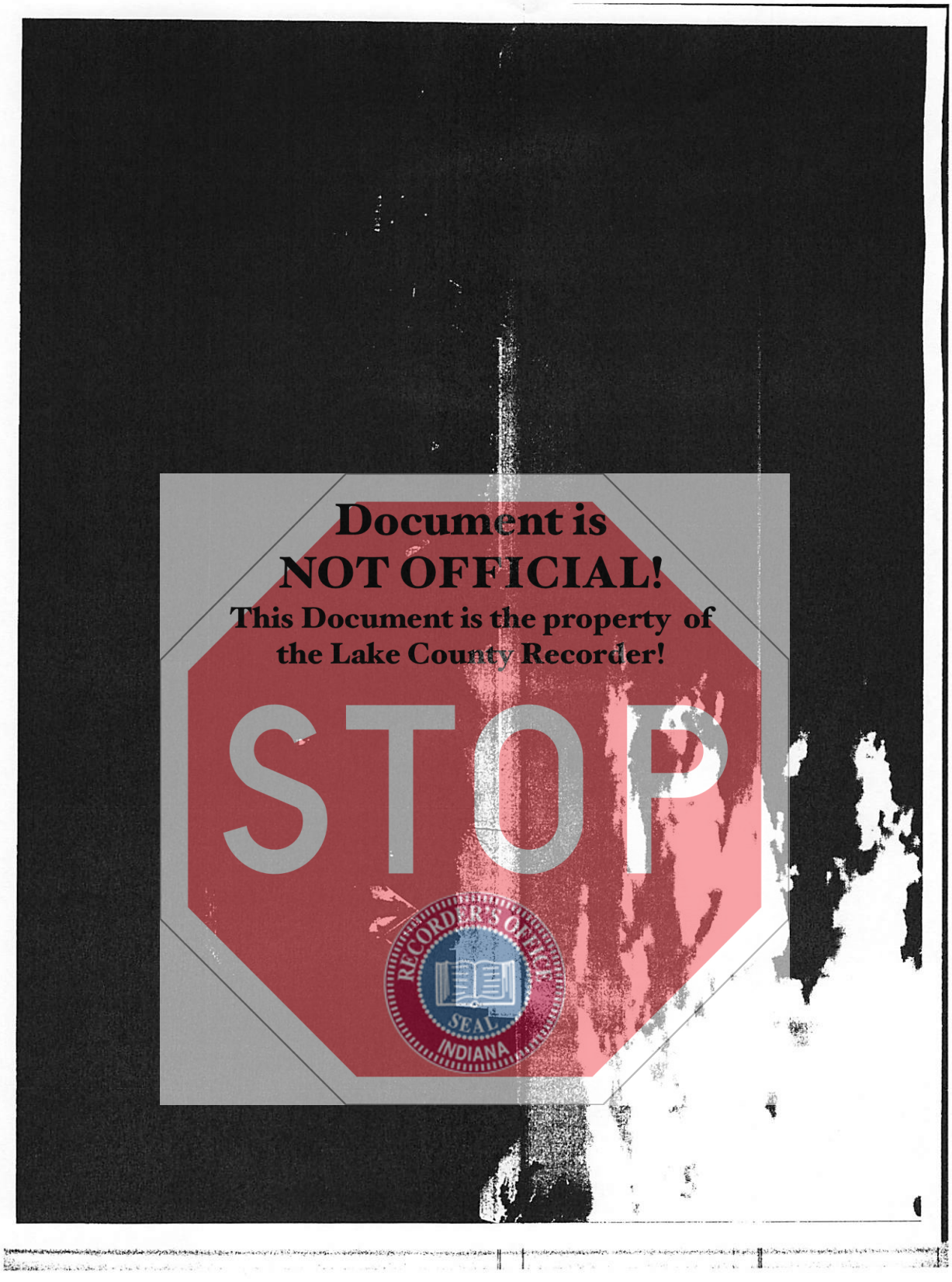
St. John is growing at a fast pace, yet continues to have significant land available for development within and adjacent to the Town boundaries. These growth opportunities in conjunction with St. John's demographics are attracting residential and commercial developers to the area. Currently, St. John is experiencing an increase in new residential development proposals, primarily from conversion of farmland in the southwest and southeast portions of the Town, and for retail developments along the US 41 and US 231 commercial corridors. Coordination of these new developments, related to the goals of this plan, are critical to ensuring that the positive attributes of the community are maintained.

US 41 Corridor Developments

US 41 is a key regional transportation route, and handles over 20,000 vehicles per day. However, due to the substantial traffic, it also acts as a barrier between east and west St. John neighborhoods. Many new retail developments are being considered for this corridor, and will soon transform the character of the highway. Traffic improvements such as expanded frontage roadways, improved intersections, and additional turning lanes are needed in combination with improvements to landscaping, signage, pedestrian amenities, and other urban design components.



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URBAN DESIGN CONCEPTS

Although St. John has high quality residential neighborhoods, open space and community facilities, it lacks a defined walkable retail district to support community gatherings and civic events. Community survey participants echoed Town leadership's vision to create a local mixed-use shopping district in the future. Additionally, as the community expands its residential neighborhoods and the number of commuters grows, there will be an increasing demand for alternative commuter transportation options. The creation of a commuter rail station in St. John is supported by the community, and continues to be a goal of Town leadership. Options for locating this future rail station, as well as concepts for development around the station were analyzed during the planning process.

US 41 Future Urban Design Considerations

Continuing to enforce form-based zoning and landscape requirements for US Route 41 will help St. John regulate the quality of retail projects along the roadway, better define the Town gateways, and improve image of the St. John. The current Zoning Code includes special building design, landscape, signage, and setback requirements for all properties that are located with the US Highway 41 Overlay District. These requirements are increasingly important as the community grows and sites along the highway are developed.

In addition to these regulations, a key strategy for improving the corridor is the creation of frontage roadways. Creating a connected frontage roadway system will help improve future traffic flow by reducing curb cuts and consolidating intersections. There are also many urban design related advantages to this strategy including:

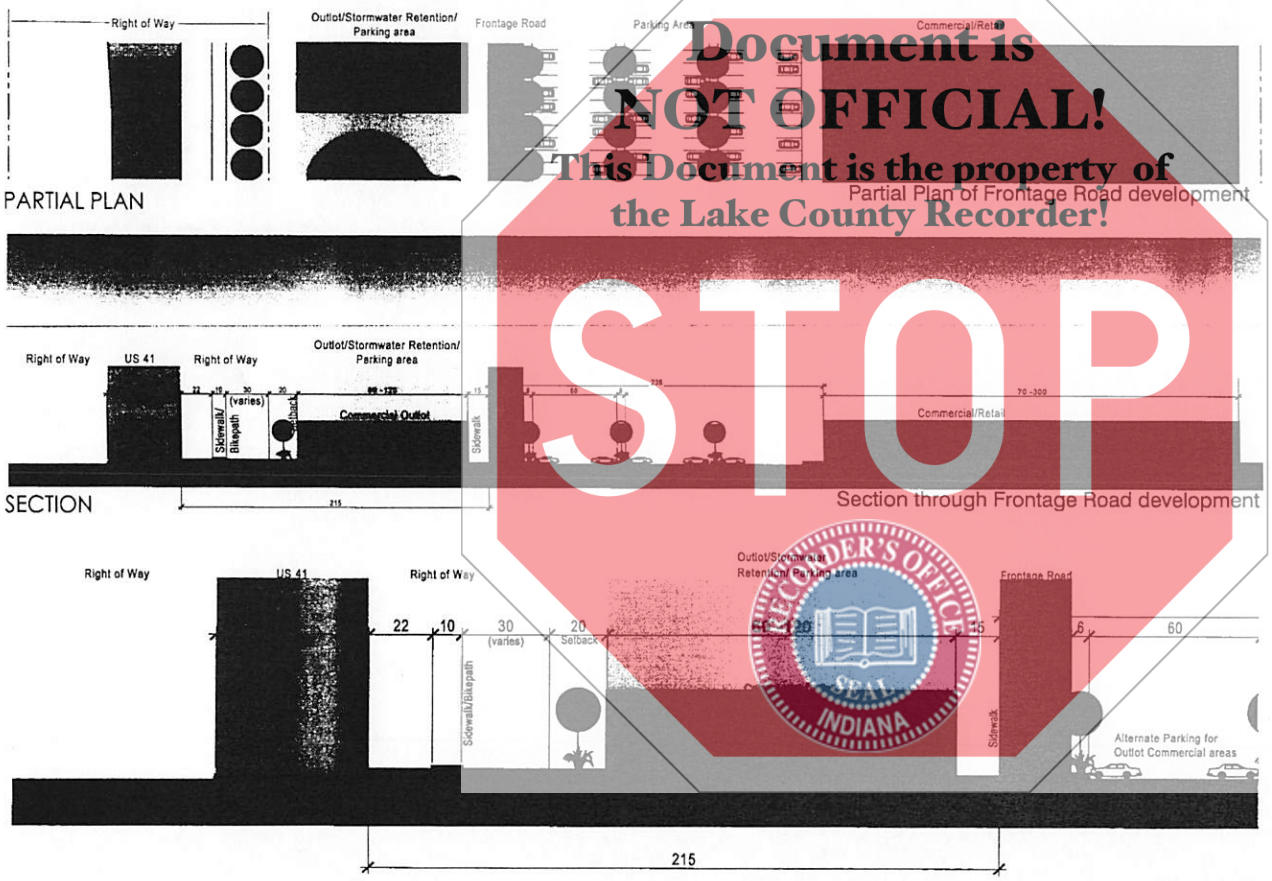
- **Providing the opportunity for outlot developments that define the edge of the street:** Typical commercial "big-box" developments along major arterials are set back hundreds of feet from the road to provide for large parking lots. The implementation of a frontage road system creates a different pattern of development by providing a parcel between the frontage road and arterial. These parcels can be used for smaller retail stores or landscaping. The introduction of commercial outlots activates the edge along the highway, adding vibrancy and improving the aesthetics of the thoroughfare.
- **Allowing for the expansion of pedestrian paths and sidewalks:** Better controlling the traffic flow, by condensing the curb cuts and redirecting traffic to signalized intersections, provides the opportunity to create safer sidewalks and pedestrian crossing areas. Reducing the driveways that cross sidewalks greatly improves safety and including a landscape buffer zone makes walking along the highway safer and more pleasant.
- **Encouraging shared parking areas:** Frontage roads allow for the possibility of connectivity between developments so that people may, if they choose, park in one space and circulate between developments on foot without having to move their car.

Frontage Road Design Considerations

The conceptual street sections on the facing page were developed in 2004, and still apply today. These concepts illustrate the components of the frontage road system, including, setbacks, outlot parcels, and the ideal location of sidewalk, and landscape areas. Future developments in the US Highway 41 Overlay District should comply with the following urban design goals:

- Providing adequate setbacks from US Route 41 to allow for cars to stack at signalized intersections.
- Allowing for a potential road widening zone along US Route 41.
- Establishing a sidewalk, bike path, and tree planting zone along the US Route 41.
- Creating safe roadway crossings for pedestrians and cyclists.
- Addressing storm water run-off requirements and coordinating the locations of landscape swales and water retention areas.
- Coordinating sign locations, heights, materials, and lighting.
- Following building design requirements for heights, depths, façade designs, landscaping and materials.

- Creating parking lots that include pedestrian and landscape provisions as well as storm water requirements.



Section showing details and recommended dimensions

Town Center Concept

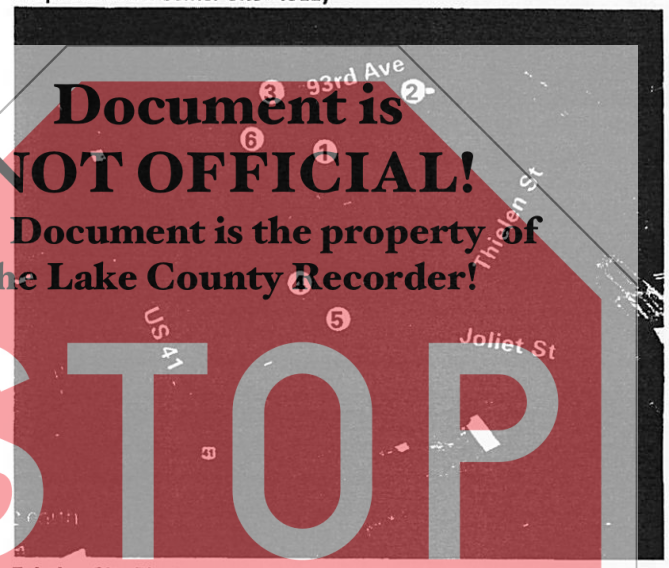
St. John's development from a small farming community to a larger Town has occurred in a patch-like pattern such that the Town is now comprised of many isolated neighborhoods without a discernible center or downtown area. One of the first issues identified in the planning meetings was the Town's desire to create an identifiable Town Center for St. John. A Town Center was perceived as an important strategy for enhancing the quality of life in St. John by providing an identifiable downtown that could be the symbolic heart of the community and play host to local events and activities.

While the concept of the traditional town center is not new, the trend to construct new town centers in already established suburban communities has evolved over the last decades in response to the characterless retail corridors that have fractured many residential communities. While many new town centers are not located in urban centers, they do offer many of the same urban characteristics such as, the creation of pedestrian-oriented destinations and the mixing of various uses including residential, retail, entertainment, office, and civic uses.

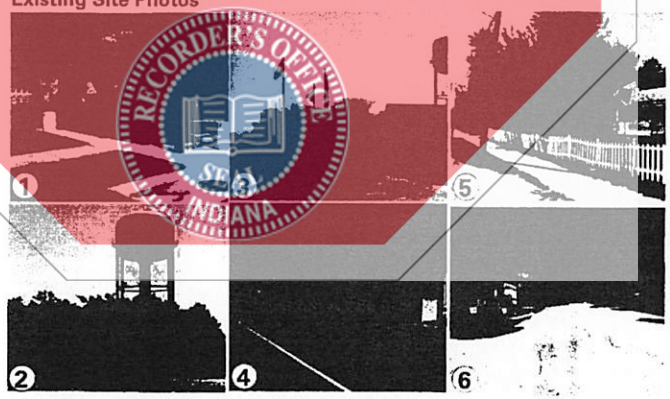
Development & Phasing of the Town Center

The recent completion of the municipal center along 93rd Avenue in St. John and the proposals for adjacent new retail uses provides a significant opportunity for St. John to develop this area into a downtown Town Center district. This existing street network adjacent to, but not directly on the US 41 corridor, creates and ideal setting to develop new community-oriented commercial uses. The existing scale and historic character can be strengthened by completing strategic street connections, incrementally developing vacant parcels, and by adding new streetscape and signage. This St. John Town Center is intended to be developed gradually overtime, as development land becomes available and new retail, restaurants, and street connections are appropriate.

Proposed Town Center Site - Today



Existing Site Photos



Concept for Future Town Center

Town Center Uses and Programming

In contrast to typical suburban mall or strip development, which is defined by big-box retail tenants and expansive parking lots, the Town Center should offer a mix of land uses, plazas or open spaces in which visitors can gather and linger. The goal of the development is to create a synergy of activities and mutually supportive uses. For example, office workers will use the retail, housing residents will use the restaurants, and visitors that see the center as a destination might decide to spend more time, thereby visiting more than one establishment.

A Town Center adjacent to the existing Municipal Center would help shape a town identity, and provide a place for community gatherings, and events. Programming of the downtown could include holiday festivals, parades, relocation of the farmers market, shopping festivals, and community picnics. The concept shown on page 61 illustrates how strategic infill and re-connection of streets would provide a walkable district, and encourage small-scale infill retail development on vacant parcels. Eventually, homes in the district could choose to convert to small scale restaurants or retail uses and would support small business creation in the Town. To the south, the planned Boyer Shopping Center (shown in yellow) incorporates larger-scale retail establishments that would help draw visitors to the area.

Town Center Development Goals

- Develop a detailed Town Center Plan with new street connection between Civic Drive and Thielen Street, retail strategies, and building, parking, signage and streetscape guidelines.
- Establish a Town Center overlay zoning district allowing mixed retail, residential, and business office uses.

Example Town Center

Downtown Plainfield, IL: Plainfield is a rural community of 40,000 people, located in Will County, IL. Plainfield has a similar demographic make-up and residential character to St. John, and has successfully revitalized their downtown district. Downtown Plainfield has a diverse building stock made up of historic homes, small businesses, and 19th century storefronts. As shown in the images above, Plainfield used creative streetscape improvements, signage, lighting and public art to help tie the district together, and provide a sense of arrival for visitors.

Streetscape & Signage Ideas

Gateways & Plazas:
Creating a sense of arrival by using large scale signage or a feature such as this clock will help to draw people off of US 41 and into the Town Center. Creating small parks and plazas will also attract people to walk to the area.

Creating a Pedestrian Environment:
Using planters, bollards, landscaping, street trees, and lighting to define a human scale to the street helps improve pedestrian safety, and encourages people to walk. Programming of the Town Center is also important, shown to the right is a town apple festival.

Pedestrian Scaled Signage & Storefronts:
Creating the scale of retail that is coordinated with existing historic properties will be important for St. John, these images illustrate awnings and pedestrian scaled signage.

Future Rail Service to St. John

The Northern Indiana Commuter Transportation District (NICTD) analyzed the potential alignment options for a new commuter rail line to connect northwest Indiana with Chicago. One existing alignment is oriented east and terminates in Valparaiso. The other alignment, called the West Lake Corridor Project, would run south along the existing CSX rail track from Hammond through Munster and into the Town of St. John. If St. John established a new commuter rail station, there would be substantial development benefits to the Town as a whole and the immediate area surrounding the station. For that reason it is very important to participate in regional rail planning, conceptualize train station locations, and plan for future development associated with the station area.

Community Benefits of Rail Service

The following are potential benefits of developing a train station in St. John:

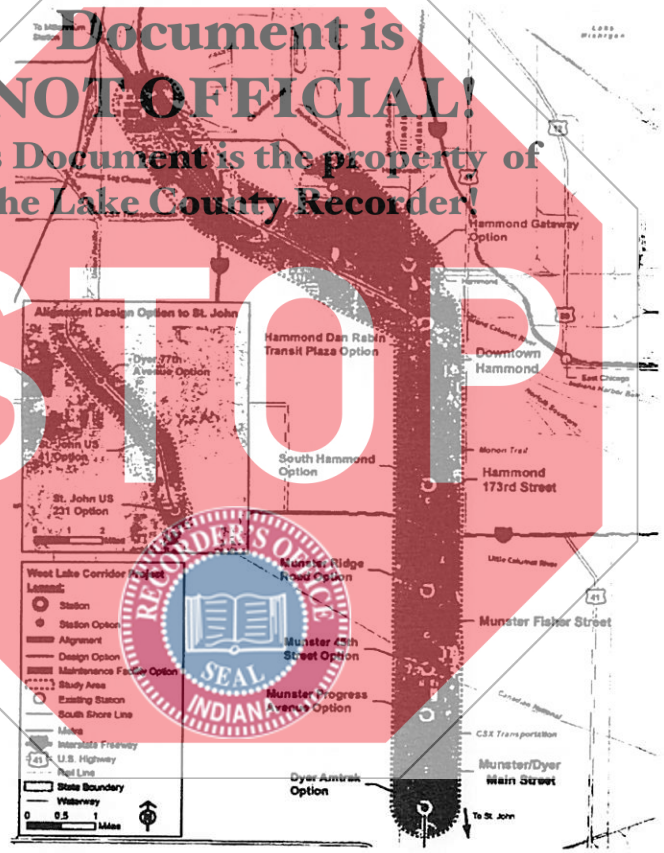
- Reduce commute times, costs, and congestion generated by residents presently driving to Chicago.
- Increase economic development from the expanded market of transit riders from nearby communities.
- Incorporate the train station as a major component and catalyst for St John's residential and retail developments.

Transit Oriented Development Goals

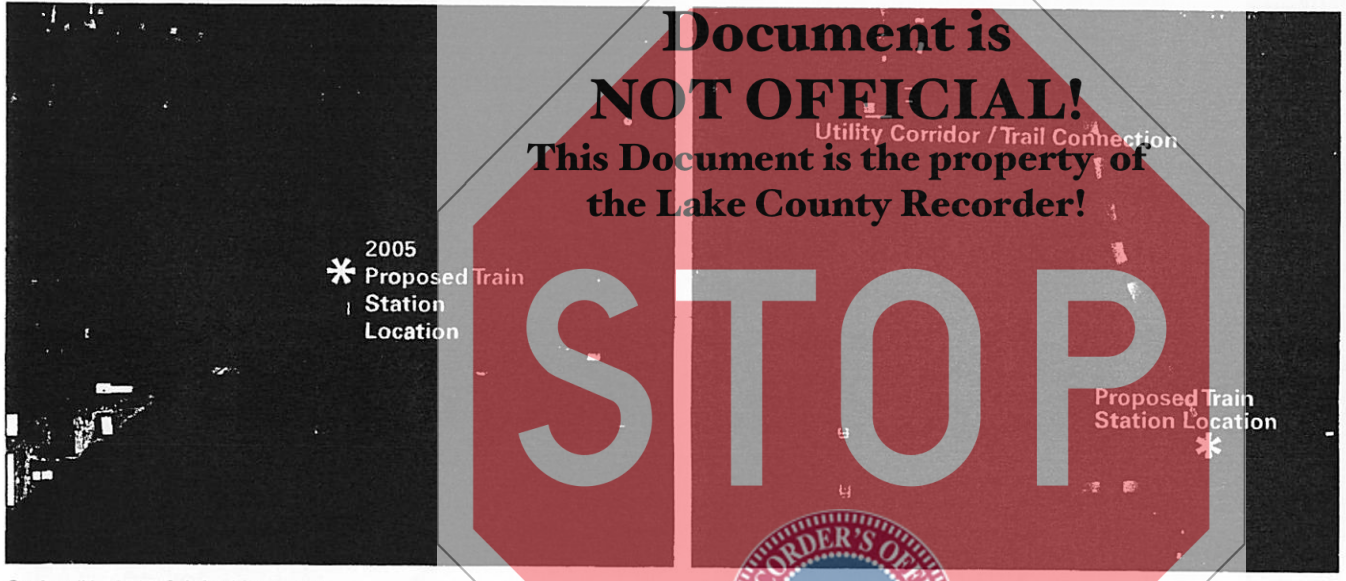
A new train station is an opportunity for St. John to establish a Transit Oriented Development (TOD). The concept of a TOD is based on national trends for station area development and includes;

- Creating pedestrian scaled streets and a walkable environment.
- Shared parking for retail and commuters.
- Establish a train station overlay district with mixed residential, retail, and business office uses.

NICTD West Lake Corridor Project Concept Map (8-14-2014 Draft)



Train Station Site Options



Option #1 - 2005 Original Location

- Located north of the existing municipal center
- Site currently houses a mix of retail, residential and the Post Office
- Limited access due to rail location, topography, intersection constraints, and roadway geometries
- Location not suitable for residential development

Option #2 - New Proposed Location

- One new intersection planned (at center of frontage)
- Site has diverse topography, with rolling hills, some marshes, and forested areas
- Train station is proposed at the southern edge of the site near US 231
- Existing rail line is at grade internal to the property with good geometry for train station
- Grade separated rail elevated over US 231, allowing for better safety, and less traffic interruptions

Train Station Mixed Use Development Concept

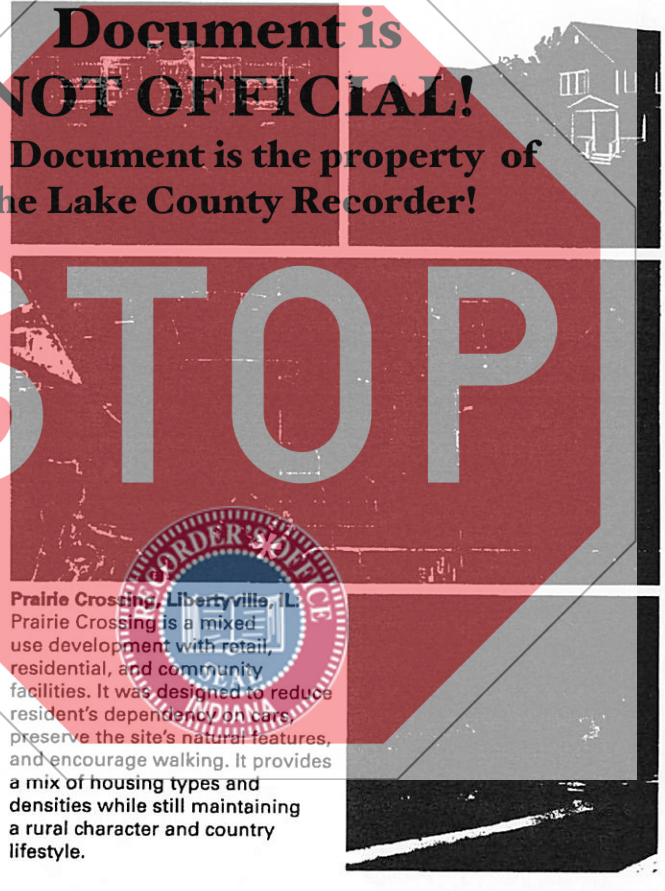
Train station site Option #2 was preferred by Town leadership, and is explored further in the conceptual rendering shown on the facing page. The existing site has extensive natural topography, some marshes, and forested areas which are preserved in the design concept as areas for stormwater detention, trails, and to serve as a buffer between retail and residential uses. To accommodate new development, a new signalized intersection at the center of the site, along US 231 frontage, would be needed, as shown.

Retail uses are designed to surround the train station, and are easily accessible from US 231. These retail areas support convenience services, restaurants, and other commuter related amenities. A small park / plaza in front of the station creates a focal point for the retail zone, and provides space for pick-up / drop-off at the station. Long term commuter parking for the rail station is provided by a future municipal parking garage, located just south of the station. The parking garage could be disguised, by using the landscape topography of the site, and by having retail and other uses along the street frontage.

Multi-family condos and townhomes are located next to other similar scaled uses - adjacent to the retail, and along the rail corridor. To the north of the retail, a neighborhood of single family homes is designed, and connected to the train station area by trails and linear parkways. This residential zone is buffered from the train station uses by the existing wooded area.

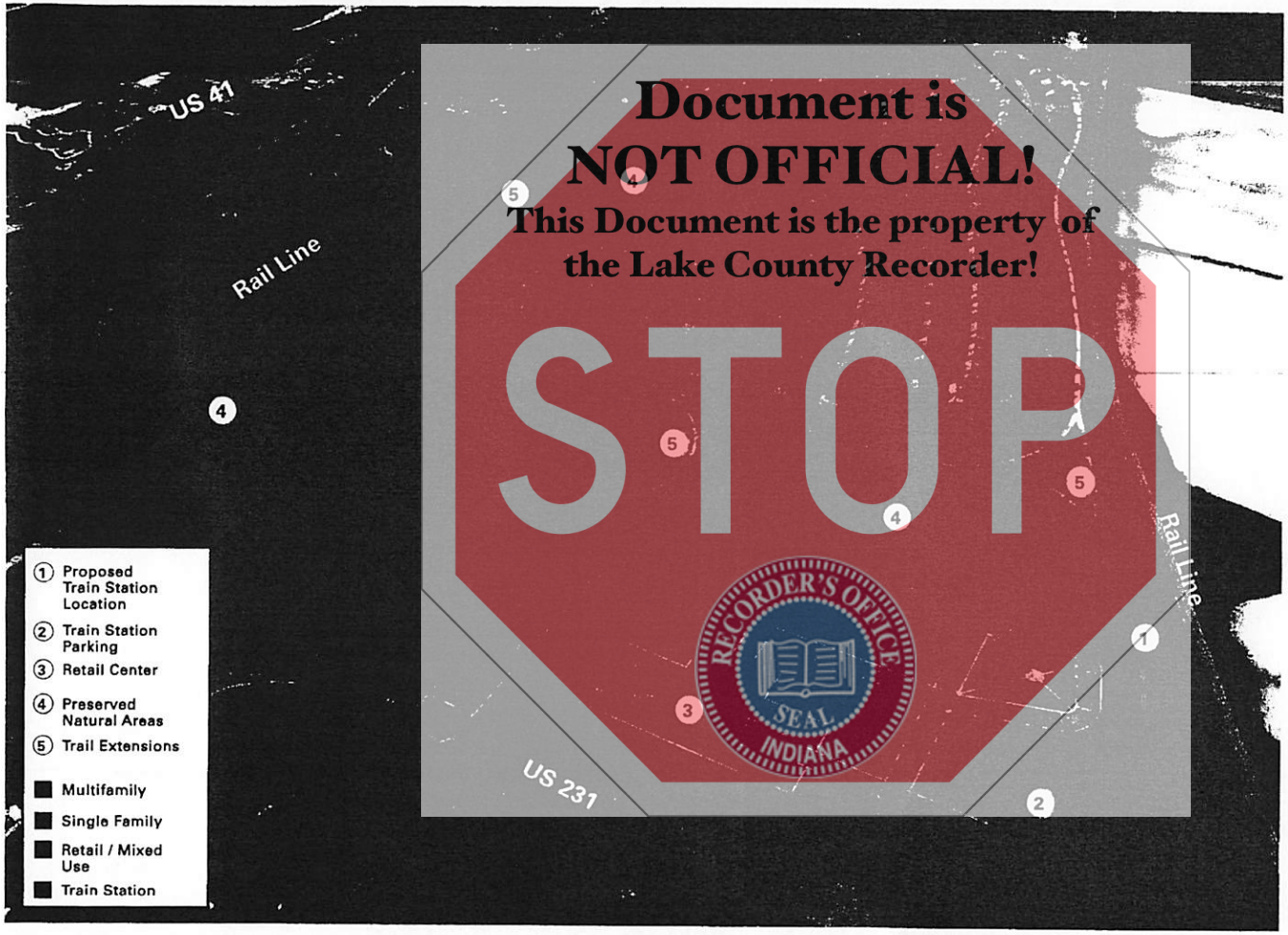
Consistent with open space and trail goals of this plan, the development includes a system of walking paths and biking trails throughout. Additionally, the northern boundary of the site is adjacent to an existing utility corridor that runs east-west through the Town. This provides the unique opportunity for trails within the train station site to be connected to existing St. John trails west of US 41. In the future, this type of trail connection would allow commuters to bike to the train station, creating a very attractive amenity for new residents.

Example Train Station Development



Prairie Crossing, Libertyville, IL: Prairie Crossing is a mixed use development with retail, residential, and community facilities. It was designed to reduce resident's dependency on cars, preserve the site's natural features, and encourage walking. It provides a mix of housing types and densities while still maintaining a rural character and country lifestyle.

Concept for Future Train Station Development (Site Option #2)



ADDITIONAL INFORMATION LINKS

Awards and Recognition of St. John:
https://www.stjohnin.com/AwardsWon.php

Town Marketing Brochure and Plans:
https://www.stjohnin.com/Development.php

2040 Comprehensive Regional Plan (NIRPC 2011)
http://www.nirpc.org/2040-plan/plan-documents.aspx

Creating Livable Communities Report (NIRPC 2013)
http://www.nirpc.org/2040-plan/creating-livable-communities-(clc).aspx

Additional Information on water infrastructure:
https://www.stjohnin.com/MS4/

Town Zoning and Ordinances:
https://www.stjohnin.com/CT/Ordinances.php

Plan Consultant:
Solomon Cordwell Buenz
Christine Carlyle, AICP, AIA,
Principal and Director of Planning

THOROUGHFARE PLAN

TOWN OF ST. JOHN

February, 2016

15-0012-04

Table of Content

THOROUGHFARE PLAN

INTRODUCTION

The coordination of land use and thoroughfare development is critical to safe and efficient access to the residents of any community. Proper access planning for commercial areas, especially along a major corridor such as U.S. 41 affects quality of life issues for residents within a community, as well as those traversing through that community on their way to and from home.

The community of St. John is growing rapidly. Sound thoroughfare planning is needed to avoid the undesirable effects of congestion and to improve community cohesion. Thoroughfare planning will set the stage for the development of new roadways in the future as commercial and residential development outside of the present Town limits become absorbed into the community.

The Thoroughfare Plan will examine the present roadway conditions, traffic volumes and safety characteristics. Deficiencies will be noted and recommendations will be brought forth. As with any Plan, it should not be viewed in a static sense. Periodic updating will be necessary in future years to keep abreast of ever-changing conditions.

FUNCTIONAL CLASSIFICATION

Functional classification of the streets in a community is one of the main concepts in thoroughfare planning. It is extremely important that the community understand that there is a hierarchy to the streets within their community. This hierarchy will set expectations about traffic volumes, speed, access control, right-of-way widths and the presence of "foreign" traffic expected to use the individual streets.

The hierarchy is set by the streets functional classification. At the top of the list is the *principal arterial* classification. U.S. 41 is such a route. It is meant to carry large volumes, including semi-truck traffic, from community to community with linkage well beyond the adjacent community.

The next classification is that of *minor arterial.* Streets like West 93rd Avenue meet this classification in that they carry significant volumes of traffic and provide connection beyond the community's border into other areas. They also serve as feeder routes to the major arterials

The next classification is the *collector street.* The last classification is the local street, which is the typical sub-division street. The collector street collects traffic from the local street network and funnels it to the minor or major arterial streets. Keilman Street is an example of a collector street.

The following information should be used to guide the development of new roadways and re-development of existing roadways in the Town:

Functional Classification	*Right-of-Way*	*Roadway Widths*	*Access Control*
Principal Arterial	100'	4 lanes = 48'	No direct residential drives Minimize commercial drives
Minor Arterial	90'	2 lanes = 24'	No direct residential drives
Collector	70'	2 lanes = 22' min.	Minimize residential drives
Local	60'	2 lanes = 20' min.	Not controlled

Note that in areas of intense commercial development and added auxiliary lanes, the needed Right-of-Way width may be 120' or greater.

ADMINISTRATIVE JURISDICTION

Within Indiana, routes with the "U.S." or "State Route" designation come under the jurisdiction of the Indiana Department of Transportation (INDOT). This means that they have total control over the roadway and access thereto. Driveway location, speed limits, improvements and maintenance (including snow removal) come under INDOT's control. They often seek input from the communities that their route passes through, but the final decisions are theirs. U.S. 41 is such a route within St. John.

All routes other than U.S. 41 within the municipal boundary of St. John are the Town's responsibility, except those that are private and/or those not accepted by the Town. The jurisdictional responsibility is an important element in determining

who is responsible for maintenance work and what funding is available to the Town for maintenance and improvement. For example the Town gets no funding from the State for maintenance or improvements for U.S. 41. Likewise the State provides funds to the Town for its streets and does no maintenance on those streets.

TRAFFIC VOLUMES

Traffic volumes were obtained from the Northwestern Indiana Regional Planning Commission (NIRPC), INDOT, and the Town for selected roadways. The results are shown in the table that follows.

Parts of the West 93rd Avenue corridor through the Town of St. John have seen very high growth rates in recent years. Vacant land is still available adjacent to this corridor so it is likely that this high growth rate will continue in the short term. As the area matures, this growth rate will slow.

Considering the above, it is likely that West 93rd Avenue, which is two-lane presently, will have to be widened in the future. The volumes in 2002/2004 were in the range of 8,500 – 9,600 Average Annual Daily Traffic (AADT). The volumes in 2015 were about 12,000 AADT. This is about a 2% annual growth which shows that the growth rate is maturing. A two-lane road can handle up to about 15,000 AADT. From 15,000 - 19,000, a three-lane roadway will suffice. Beyond 19,000 AADT, a four-lane roadway should be considered. If the present rate continues, 93rd Avenue to the west of US 41 should be considered for widening to three (3) lanes in about twelve (12) years, 2027, and on to a four (4) lane road in about fifteen (15) years thereafter. Additional traffic counts should be taken every three (3) to five (5) years to monitor the growth in traffic volumes to determine if this growth rate continues. For the time being, it is recommended that all future development along West 93rd Avenue be platted with a 45' half right-of-way in order to provide the Town with sufficient width to widen to four lanes and have auxiliary left turn lanes.

The other area of concern is West 109th Avenue west of U.S. 41. In 1995, the AADT was 9,367. By the year 2011, the volumes have increased to 11,190 (That is about 1.2% to 1.3% increase per year). As development moves south, this roadway may increase in traffic flow as well. This road also serves traffic traveling west into Illinois. Consequently, to the extent that the Town can have

input in new developments along this route, a 50' half right-of-way should also be platted with those developments.

CRITICAL INTERSECTION ANALYSIS: U.S 41 AND 93RD AVENUE

The highest volume intersection in the Town is the intersection of West 93rd Avenue and U.S. 41. The intersection was mentioned by members of the audience in the Community outreach meeting for the Comprehensive Plan Update held in the summer of 2015 as an intersection with considerable delay.

The operating condition of that intersection can be described by its Level of Service. Level of Service is expressed as a letter grade of "A" through "F", with "A" being best and "F" being worst. The Level of Service is defined in terms of delay time. Level of Service "A" means that there is a minimum of delay experienced by most motorists using the intersection. The Level of Service "F" means that motorists are experiencing a great deal of delay (i.e. sitting through multiple signal cycles before making it through the intersection). For areas such as this location, Level of Service "C" is desirable and "D" is the generally accepted minimum allowable. Traffic counts were collected in September of 2015 for the morning and afternoon peak traffic periods. The intersection operates at a Level of Service C for both of those periods. There is an issue with the length of the left turn lane on the west approach. The morning left turn volume is so high that the left turn traffic spills out into the thru lane and blocks that traffic periodically from reaching the signal. It is approximately 170 feet in length and should be lengthened to about 320 feet.

Other Intersections Considered for Analysis:

There are a number of key intersection that should be considered for additional analysis, especially when large developments (i.e., greater than 95 homes) are being proposed in the immediate vicinity. These include:

1. Calumet Avenue and West 93rd Avenue
2. Calumet Avenue and 101st Street
3. White Oak Avenue and West 93rd Avenue
4. White Oak Avenue and 101st

TRAFFIC VOLUME

			AADT	Number Of Lanes	Year of Count	AADT	Year of Count
1.	Corridors						
	US 41	North of 93rd Avenue	18,850	4	1999	32,350	2011
		South of 93rd Avenue	16,520	4	1999	23,154	2011
		South of 97th Lane	18,500	4	1999	22,965	2011
		South of 109th	13,380	4	1999	22,111	2011
	West 93rd Avenue	West of White Oak	8,375	2	2004	9,525	2011
		East of White Oak	9,647	2	2004		
		West of US 41	8,034	2	2002	12,000	2015
		East of US 41	5,312	2	2004	9,700	2015
2.	Other Locations						
	Parrish	South of Joliet	763	2	2004	6,025	2013
	Joliet Street	West of Parrish	2,727	2	2004	3,507	2013
	Joliet Street	East of US 41	2,321	2	2003	6,025	2011
	West 85th	East of US 41	4,949	2	2004	5,345	2013
	Patterson Street	North of 93rd Avenue	3,053	2	2003	6,025	2011
	109th	West of US 41	9,367	2	*1995	11,190	2011

ACCIDENT ANALYSIS

The intersection of U.S. 41 and Joliet Street was mentioned at the Community Outreach Meeting as a high accident area.

Accident reports for the years 2001 through 2003 and 2012 through 2014were provided by the St. John Police Department. The accidents occurring were as follows:

	Joliet Street
2001	3
2002	3
2003	11

	Joliet Street
2012	8
2013	13
2014	18

The numbers of accidents increased dramatically in the year 2003 and have continued to increase in recent years. There were construction activities occurring along U.S. 41 in 2003 which increased congestion and contributed to that increase. Since 2005, the Town has widening the Joliet Street approach at the intersection to provide two westbound lanes. This benefited the intersection by lessening the delay for those turning right; however the accidents have continued to increase. The Town is planning to extend 96th Place to Joliet Street as part of joint public/private development. The improvements will include a traffic signal at the intersection with 95th. The existing intersection of Joliet Street and U.S. 41 will be modified to only permit right turn in and right turn out movements. The remaining movements will be able to use the new connection from Joliet Street to 96th Place.

ACCESS ISSUES – RESIDENTIAL

From the field review of street conditions and a general review of the map of the Town streets, it is evident that residential development has occurred in such a manner as to result in neighborhoods that are isolated from one another and without a network of collector streets crossing the community. West 93rd Avenue and West 109th Street are the only two east/west streets that go all the way through Town. U.S. 41 is the only north/south street. The lack of through streets puts added traffic on these three streets for local trips that could be more easily handled if there were alternative options. This added traffic results in increased congestion and accelerates the need to widen these roadways. Additionally, the isolation of neighborhoods discourages pedestrian and bike movements between neighborhoods.

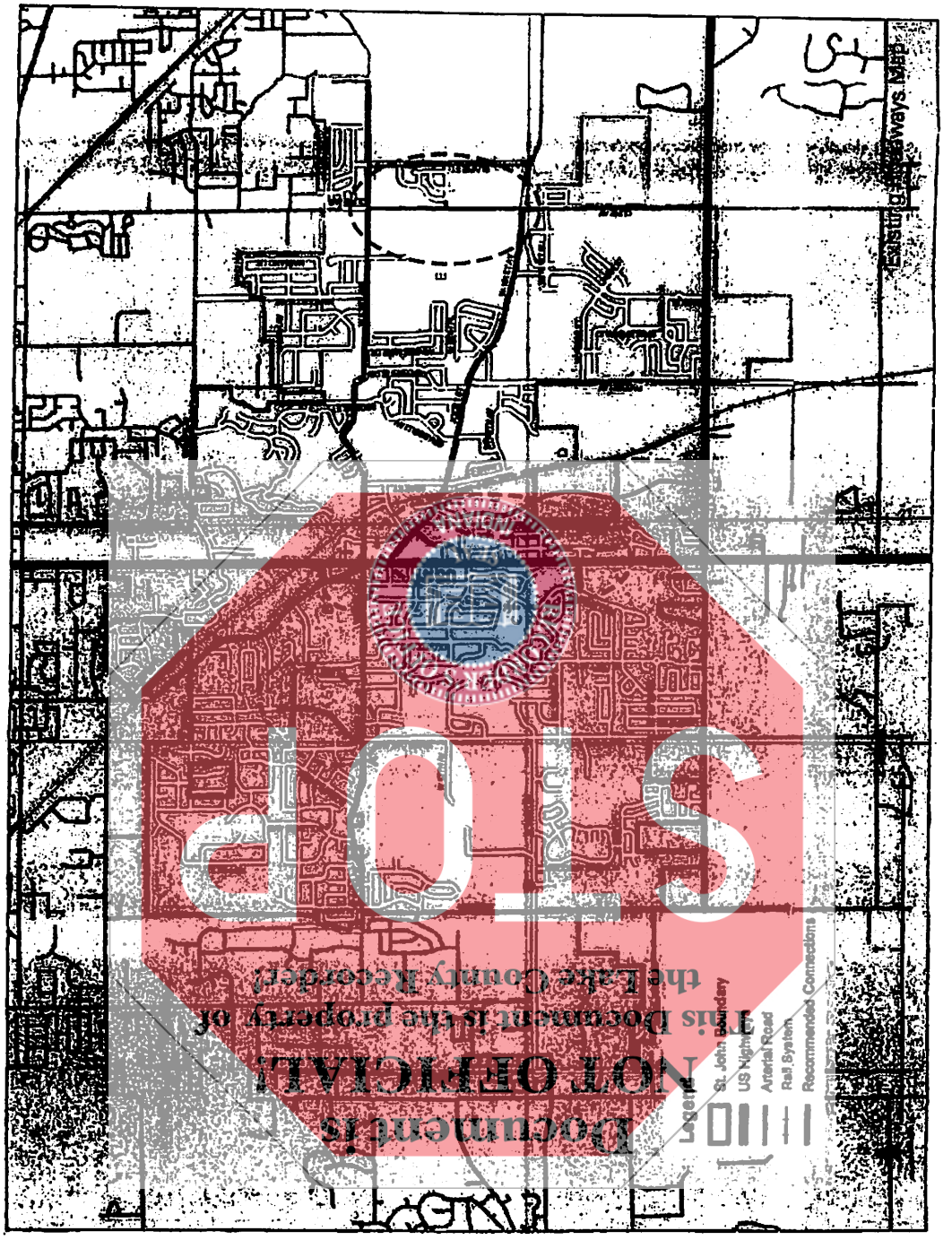
It is strongly recommended that new developments be connected to adjacent developments and further that multiple opportunities be provided in these new developments for connections to future adjacent development.

It is suggested that the following connections be provided within the Town as future developments take place:

1. East to West connections
   - A. West 90th Avenue from Franklin Drive to Olcott Avenue
   - B. West 105th Street from Bull Run Drive to US 41 (location is conceptual and may vary from the location shown on the map)

2. North to South connections
   - A. White Oak Avenue from West 93rd Ave. to West 85th Avenue
   - B. Monfort Drive from Hoffman Pl to West 93rd Avenue
   - C. Patterson Street – new connection. Extend Kellman Street to PattersonStreet at Wall Street.
   - D. US 41 Frontage Road. Connect Bailey Street and Schneider Place from 103rd Lane to 103rd Avenue
   - E. Extend Parish Street to connect with the intersection with Clarmonte Drive.
   - F. Extend Clarmonte Drive from 93rd Avenue to Parish Ave.

The following map (Figure 1) graphically depicts these connections.



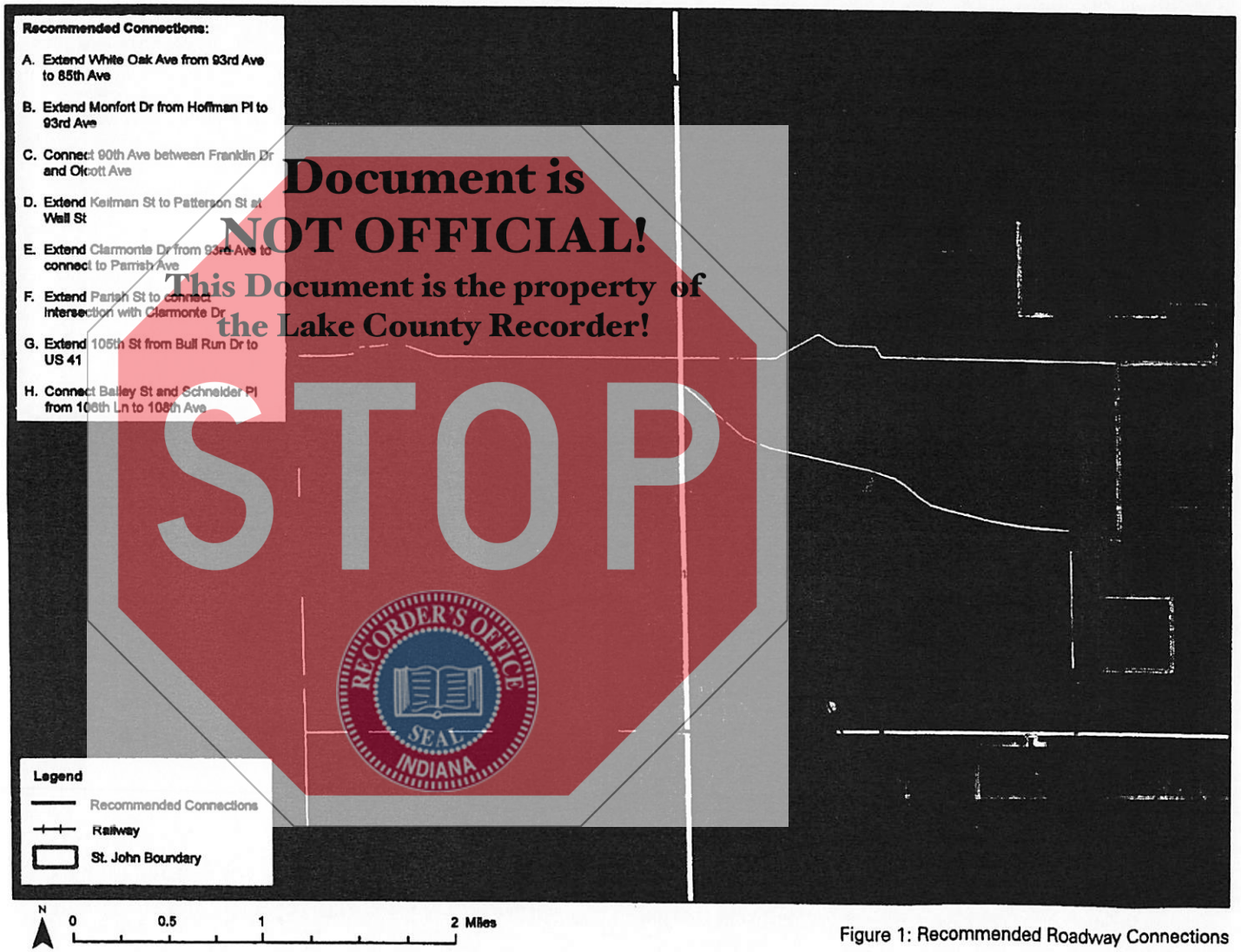


Figure 1: Recommended Roadway Connections

On the previous mentioned map, the street connections are recommended as collectors. It is strongly recommended that all new developments on arterial streets have only street access to other arterial streets. All lots on the arterial streets should have their access via the internal sub-division streets. This is recommended in order to reduce the number of conflict points along the arterial and to orient individual residential lot access onto local streets rather than arterial streets. This will also eliminate potential complaints by those living on the arterial streets about congestion, speeding and high traffic volumes.

New developments that are quite large on collector streets should also be oriented to provide lot access via the internal streets.

For large developments that encompass both sides of an arterial or a collector, the developer should consider a round-about or traffic circle if his Traffic Impact Study indicates that there is insufficient traffic volume to warrant a traffic signal and there is a poor level of service under two-way or four-way stop control.

ACCESS ISSUES – U.S. 41 COMMERCIAL

The U.S. 41 corridor is the primary commercial corridor for the Town of St. John. The Town has made efforts, with good success, at consolidating access to U.S. 41 for new developments. These efforts should continue as the greater the number of access points to U.S. 41, the more potential for congestion and accidents. New developments and redevelopment of existing lots should be required to have cross access agreements with adjacent parcels and connections between parking areas internal to the developments. Large-scale developments should also consider access connections to adjacent residential areas and frontage road connections.

Frontage roads can take the traditional form serving as a divider between the nearer outlot development and the larger development at the back of the lot. For lots that are not large enough for this type of development, back access roads are recommended. Also see the Comprehensive Plan for information concerning the future of Route 41. Care must be taken to design frontage roads at least 150' back from U.S. 41 to allow sufficient storage distance at signalized access points on U.S. 41. As the signalized access points are designed they should include right and left turn lanes on U.S. 41 and left turn lanes as a minimum on the side streets. Without the left turn lanes the signal will function less efficiently.

By interconnecting the commercial properties along U.S. 41, access can be controlled in a more organized manner. Consolidating access will likely mean signalized access control. Traffic signals work best if their spacing is 1000 feet or more. The Town should strive to achieve the spacing of major access points with that spacing in mind.
This may require that some lots be granted individual drives on a temporary basis until adjacent properties can be developed with the appropriate cross-access arrangements. Some type of covenant or condition of development approval should specifically and legally stipulate that these drives are temporary pending cross access to centralized signalized access points.

From a review of the development along U.S. 41, it is suggested that the Town attempt to direct future signalized access at or near the following locations:

1. Wall Street
2. 96th Avenue
3. 101st Avenue
4. 103rd Avenue
5. 105th Avenue

As stated earlier, INDOT has jurisdiction over U.S. 41. Consequently, the Town will need to work closely with INDOT, as they have in the past, to achieve the desired results concerning access to U.S. 41.

US 231 Corridor Discussion

The U.S. 231 corridor runs from U.S. 41 to the eastern Town Limits at Cline Avenue. The area between Parrish Avenue and Cline Avenue is rapidly developing into a commercial corridor with residential and office behind the corridor. The town has approved development plans that have minimized access onto U.S. 231 to keep from adding unnecessary access point along the route. The Town's vision for this corridor is for retail and/or office space fronting U.S. 231. A recent Traffic Study for the Mill Creek Subdivision included a corridor review of existing, approved and potential development in the vacant area between Parrish Avenue and Cline Avenue. Access for the vacant parcels along U.S. 231 was limited to the existing intersections and a single right-in/right-out drive between the intersections. Parrish Avenue and Cline Avenue are presently signalized. Park Place which is located between these two intersections will warrant a traffic signal in the future. Traffic volumes at full build-out will warrant

a 4-lane section with right turn lanes for the right-in/right-out drives and left turn lanes at the signalized intersections A raised 4 feet divided median is recommended throughout. Future development along U.S. 231 should provide a 60 foot half Right-of-Way order to provide the room for these improvements and utilities/sidewalks. The area between U.S. 41 and Parrish Avenue will be limited somewhat by the presence of the two rail lines. It is anticipated that the same 4 lane section will be needed in this area and the main entrance into the future proposed rail station development will be signalized. A secondary right-in/right-out drive may also be provided for additional access. The signalized intersection should have an eastbound left turn lane and a westbound right turn lane.

In the short term, the Town may consider the installation of left turn lanes on U.S. 231 at the intersections with Parrish Avenue and with Cline Avenue to provide left turning traffic a place to wait for the opposing gaps and not impede the thru movements.

RECOMMENDATIONS

The following are recommended actions resulting from this Thoroughfare Plan:

1. New developments on the various classifications of streets should have the required Right of Ways, as noted elsewhere in this plan, dedicated at the time of planning approval.

2. The west approach of 93rd Avenue to U.S.41 should be widened to lengthen the left turn lane to approximately 320 feet.

3. Access to U.S. 41 should be consolidated wherever and whenever the opportunity presents itself through re-development of existing properties. Frontage roads or cross access between properties should be required wherever possible to allow for traffic to move from development to development without having to use U.S. 41.

4. New residential sub-divisions should be linked to adjacent sub-divisions. Sub-divisions located on arterial or collector streets should not have direct driveway access to those streets but rather by way of the internal street system.

5. Specific linkages are recommended for improved circulation. These include:

   A. East to West connections
      1. West 90th Avenue from Franklin Drive to Olcott Avenue
      2. West 105th Street from Bull Run Drive to US 41 (location is conceptual and may vary from the location shown on the map)

   B. North to South connections
      1. White Oak Avenue from West 93rd Ave. to West 85th Avenue
      2. Monfort Drive from Hoffman Pl to West 93rd Avenue
      3. Patterson Street – new connection. Extend Kellman Street to Patterson Street at Wall Street.
      4. US 41 Frontage Road. Connect Bailey Street and Schneider Place from 106th Lane to 108th Avenue
      5. Extend Parish Street to connect with the intersection with Clarmonte Drive.
      6. Extend Clarmonte Drive from 93rd Avenue to Parish Ave.

6. Access to U.S. 231 between Parrish Avenue and Cline Avenue should be limited to full access at Park Place and right in/right out between intersections. 60 feet of half R/W should be required of all new developments in this area for future roadway improvements.

7. There are a number of key intersections that the Town should consider further investigation if new residential development (with 95 or more homes) is proposed in their vicinity. These would include:

   A. Calumet Avenue and West 93rd Avenue
   B. Calumet Avenue and 101st Street
   c. White Oak Avenue and West 93rd Avenue
   D. White Oak Avenue and 101st

APPENDIX

Traffic Counts:

93rd Avenue at U.S. 41

APPENDIX 1

TRAFFIC COUNT SUMMARY SHEET

LOCATION: US 41 and 93rd | DATE: | XXXXXXXX

TIME BEGIN	North Approach on US 41 Right	North Approach on US 41 Thru	North Approach on US 41 Left	North Approach on US 41 Total	East Approach on 93rd Right	East Approach on 93rd Thru	East Approach on 93rd Left	East Approach on 93rd Total	South Approach on US 41 Right	South Approach on US 41 Thru	South Approach on US 41 Left	South Approach on US 41 Total	West Approach on 93rd Right	West Approach on 93rd Thru	West Approach on 93rd Left	West Approach on 93rd Total	Total N/S	Total E/W	Total
6:00	68	609	75	752	78	149	104	331	67	1087	147	1301	92	147	255	494	1671	825	2797
7:00	75	654	67	796	105	127	109	340	64	1061	140	1265	71	121	195	390	2001	730	2731
8:00																			
9:00																			
10:00																			
11:00																			
12:00																			
1:00																			
2:00																			
3:00																			
4:00	62	1111	94	1267	72	172	145	389	66	702	186	954	116	171	162	449	2246	838	3104
5:00	82	1092	106	1280	61	164	146	391	80	677	176	933	139	179	153	471	2226	862	3090

Traffic Counts:

93rd Avenue east of U.S. 41

APPENDIX 2

25.00 EAST OF 41

SEE NB = EC

Traffic Counts:

93rd Avenue west of U.S. 41

APPENDIX 3

[redacted]

ST JOHN
LAKE

[redacted] WB [redacted] EB

DAY TOTAL
PERCENT

AM Times
AM Peaks

PM Times
PM Peaks

Highway Capacity Analysis:
93rd Avenue and U.S. 41 AM Peak

APPENDIX 4

HCS+: Signalized Intersections Release 5.4

Analyst:
Agency:
Date: 9/21/2015
Period: am peak
Project ID: US 41 and 93rd
E/W St: 93rd

Inter.:
Area Type: All other areas
Jurisd:
Year :
N/S St:

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	0	1	2	0	1	2	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Volume	256	147	92	104	149	78	147	1067	57	73	569	58
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	A	A			NB	Left	A	A		
	Thru		A				Thru		A		
	Right		A				Right		A		
	Peds						Peds				
WB	Left	A	A			SB	Left	A	A		
	Thru		A				Thru		A		
	Right		A				Right		A		
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		10.0	20.0					9.0	35.0		
Yellow		3.0	3.0					3.0	3.0		
All Red		1.0	1.0					1.0	1.0		

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	358	1770	0.78	0.38	35.8	D		
TR	390	1755	0.67	0.22	36.3	D	36.0	D
Westbound								
L	348	1770	0.32	0.38	20.0+	C		
TR	393	1767	0.63	0.22	34.8	C	30.2	C
Northbound								
L	383	1770	0.42	0.53	12.3	B		
TR	1369	3520	0.89	0.39	33.6	C	31.2	C
Southbound								
L	260	1770	0.30	0.53	16.6	B		
TR	1360	3497	0.50	0.39	21.2	C	20.7	C

Intersection Delay = 29.3 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.4

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst:
Agency/Co.:
Date Performed: 9/21/2015
Analysis Time Period: am peak
Intersection:
Area Type: All other areas
Jurisdiction:
Analysis Year:
Project ID: US 41 and 93rd
E/W St: 93rd N/S St:

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	256	147	92	104	149	78	147	1067	57	73	569	58
% Heavy Veh	2	2	2	2	2	2	2	2	2	2	2	2
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PK 15 Vol	70	40	25	28	40	21	40	290	15	20	155	16
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900		1900	1900		1900	1900	
ParkExist												
NumPark												
No. Lanes		1	1 0		1	1 0		1	2 0		1	2 0
LGConfig	L		TR	L		TR	L		TR	L		TR
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			0			0			0			0
Adj Flow	278	260		113	247		160	1222		79	681	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs		0.385			0.344			0.051			0.093	
Peds Bikes		0			0			0			0	
Buses	0	0		0	0		0	0		0	0	
%InProtPhase	0.0			0.0			0.0			0.0		
Duration	0.25		Area Type: All other areas									

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Arriv. Type	3	3		3	3		3	3		3	3	
Unit Ext.	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext of g	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	A	A			NB Left	A	A			
	Thru		A			Thru		A			
	Right		A			Right		A			
	Peds					Peds					
WB	Left	A	A			SB Left	A	A			
	Thru		A			Thru		A			
	Right		A			Right		A			
	Peds					Peds					
NB	Right					EB Right					
SB	Right					WB Right					
Green		10.0	20.0				9.0	35.0			
Yellow		3.0	3.0				3.0	3.0			
All Red		1.0	1.0				1.0	1.0			

Cycle Length: 90.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	256	147	92	104	145	78	147	1067	37	73	569	58
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj flow	278	160	100	113	162	85	160	1160	40	79	618	63
No. Lanes		1	1	0	1	1	0	1	2	0	1	2	0
Lane group	L		TR	L		TR	L		TR	L		TR
Adj flow	278		260	113		247	160		1222	79		681
Prop LTs	1.000		0.000	1.000		0.000	1.000		0.000	1.000		0.000
Prop RTs		0.385			0.344			0.051			0.093	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L		TR	L		TR	L		TR	L		TR
So	1900		1900	1900		1900	1900		1900	1900		1900
Lanes	1		1	0	1		1	0	1		2	0
fW	1.000		1.000	1.000		1.000	1.000		1.000	1.000		1.000
fHV	0.980		0.980	0.980		0.980	0.980		0.980	0.980		0.980
fG	1.000		1.000	1.000		1.000	1.000		1.000	1.000		1.000
fP	1.000		1.000	1.000		1.000	1.000		1.000	1.000		1.000
fBB	1.000		1.000	1.000		1.000	1.000		1.000	1.000		1.000
fA	1.000		1.000	1.000		1.000	1.000		1.000	1.000		1.000
fLU	1.000		1.000	1.000		1.000	1.000		1.000	1.000		1.000
fRT			0.942			0.948			0.992			0.986
fLT	0.950		1.000	0.950		1.000	0.950		1.000	0.950		1.000
Sec.	0.325			0.304			0.256			0.103		
fLpb	1.000		1.000	1.000		1.000	1.000		1.000	1.000		1.000
fRpb			1.000			1.000			1.000			1.000
S	1770		1755	1770		1767	1770		3520	1770		3497
Sec.	605			566			476			191		

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot		197	1770	# 0.11	0.111	197	1.00
Perm		81	605	0.13	0.267	161	0.50
Left	L	278			0.38	358	0.78
Prot							
Perm							
Thru	TR	260	1755	# 0.15	0.22	390	0.67
Right							
Westbound							
Prot		113	1770	0.06	0.111	197	0.57
Perm		0	566	0.00	0.267	151	0.00
Left	L	113			0.38	348	0.32
Prot							
Perm							
Thru	TR	247	1767	0.14	0.22	393	0.63
Right							
Northbound							
Prot		160	1770	# 0.09	0.100	177	0.90
Perm		0	476	0.00	0.433	206	0.00
Left	L	160			0.53	383	0.42
Prot							
Perm							
Thru	TR	1222	3520	# 0.35	0.39	1369	0.89
Right							
Southbound							
Prot		79	1770	0.04	0.100	177	0.45
Perm		0	191	0.00	0.433	83	0.00
Left	L	79			0.53	260	0.30
Prot							
Perm							
Thru	TR	681	3497	0.19	0.39	1360	0.50
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.70
Total lost time per cycle, L = 16.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.85

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
L	0.78	0.38	25.5	1.000	358	0.33	10.3	0.0	35.8	D		
TR	0.67	0.22	32.0	1.000	390	0.24	4.3	0.0	36.3	D	36.0	D
Westbound												
L	0.32	0.38	19.5	1.000	348	0.11	0.5	0.0	20.0+	C		
TR	0.63	0.22	31.6	1.000	393	0.21	3.2	0.0	34.8	C	30.2	C
Northbound												
L	0.42	0.53	12.1	1.000	383	0.11	0.7	0.0	12.8	B		
TR	0.89	0.39	25.7	1.000	1369	0.42	7.8	0.0	33.6	C	31.2	C
Southbound												
L	0.30	0.53	15.9	1.000	260	0.11	0.7	0.0	16.6	B		
TR	0.50	0.39	20.9	1.000	1360	0.11	0.3	0.0	21.2	C	20.7	C

Intersection delay = 29.3 (sec/veh) Intersection LOS = C

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	90.0 sec				
Total actual green time for LT lane group, G (s)		34.0	34.0	48.0	48.0
Effective permitted green time for LT lane group, g(s)		24.0	24.0	39.0	39.0
Opposing effective green time, go (s)		20.0	20.0	35.0	35.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	2	2
Adjusted LT flow rate, VLT (veh/h)		278	113	160	79
Proportion of LT in LT lane group, PLT		1.000	1.000	1.000	1.000
Proportion of LT in opposing flow, PLTo		0.00	0.00	0.00	0.00
Adjusted opposing flow rate, Vo (veh/h)		247	260	681	1222
Lost time for LT lane group, tL		4.00	4.00	4.00	4.00
Computation					
LT volume per cycle, LTC=VLTC/3600		6.95	2.83	4.00	1.98
Opposing lane util. factor, fLUo		1.000	1.000	0.952	0.952
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		6.18	6.50	8.94	16.05
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g		0.0	0.0	0.0	0.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)		1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]		0.78	0.78	0.61	0.61
gq, (see Exhibit C16-4,5,6,7,8)		11.13	11.82	13.64	30.48
gu=g-gq if gq>=gf, or =g-gf if gq<gf		12.87	12.18	25.36	8.52
n=Max(gq-gf)/2,0)		5.57	5.91	6.82	15.24
PTHo=1-PLTo		1.00	1.00	1.00	1.00
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]		1.00	1.00	1.00	1.00
EL1 (refer to Exhibit C16-3)		1.65	1.67	2.54	4.34
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g		0.17	0.17	0.10	0.10
gdiff=max(gq-gf,0)		0.00	0.00	0.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)		0.32	0.30	0.26	0.10
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT		0.325	0.304	0.256	0.103

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET
for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	90.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					

Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	0.952	0.952
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)], (fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.

* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and recalculations.

** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.

For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				

OCCbicg
OCCr
Number of cross-street receiving lanes, Nrec
Number of turning lanes, Nturn
ApbT
Proportion right-turns, PRT
Proportion right-turns using protected phase, PRTA
Right turn adjustment, fRpb

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT
Cycle length, C 90.0 sec				
Adj. LT vol from Vol Adjustment Worksheet, v	278	113	160	79
v/c ratio from Capacity Worksheet, X	0.78	0.32	0.42	0.30
Protected phase effective green interval, g (s)	10.0	10.0	9.0	9.0
Opposing queue effective green interval, gq	11.13	11.82	13.64	30.48
Unopposed green interval, gu	12.87	12.18	25.36	8.52
Red time r=(C-g-gq-gu)	56.0	56.0	42.0	42.0
Arrival rate, qa=v/(3600(max[X,1.0]))	0.08	0.03	0.04	0.02
Protected ph. departure rate, Sp=s/3600	0.492	0.492	0.492	0.492
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)	0.31	0.31	0.20	0.24
XPerm	0.46	0.20	0.34	0.41
XProt	1.04	0.42	0.51	0.25
Case	2	1	1	1
Queue at beginning of green arrow, Qa	4.32	1.76	1.87	0.92
Queue at beginning of unsaturated green, Qu	2.82	0.37	0.61	0.67
Residual queue, Qr	0.18	0.00	0.00	0.00
Uniform Delay, d1	25.5	19.5	12.1	15.9

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00		25.5	0.00	0.0	0.0	35.8
TR	0.0	0.00	35.0	32.0	0.00	0.0	0.0	36.3
	0.0						0.0	
Westbound								
L	0.0	0.00		19.5	0.00	0.0	0.0	20.0+
TR	0.0	0.00	35.0	31.6	0.00	0.0	0.0	34.8
	0.0						0.0	
Northbound								
L	0.0	0.00		12.1	0.00	0.0	0.0	12.8
TR	0.0	0.00	27.5	25.7	0.00	0.0	0.0	33.6
	0.0						0.0	
Southbound								
L	0.0	0.00		15.9	0.00	0.0	0.0	16.6
TR	0.0	0.00	27.5	20.9	0.00	0.0	0.0	21.2
	0.0						0.0	

Intersection Delay 29.3 sec/veh Intersection LOS C

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	TR		L	TR		L	TR		L	TR	
Init Queue	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Flow Rate	278	260		113	247		160	641		79	357	
So	1900	1900		1900	1900		1900	1900		1900	1900	
No.Lanes	1	1	0	1	1	0	1	2	0	1	2	0
SL	948	1755		920	1767		719	1848		487	1836	
LnCapacity	358	390		348	393		383	719		260	714	
Flow Ratio	0.3	0.1		0.1	0.1		0.2	0.3		0.2	0.2	
v/c Ratio	0.78	0.67		0.32	0.63		0.42	0.89		0.30	0.50	
Grn Ratio	0.38	0.22		0.38	0.22		0.53	0.39		0.53	0.39	
I Factor		1.000			1.000			1.000			1.000	
AT or PVG	3	3		3	3		3	3		3	3	
Pltn Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
PF2	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Q1	4.7	5.9		1.8	5.6		1.9	15.0		1.0	6.8	
kB	0.4	0.4		0.4	0.4		0.4	0.6		0.3	0.6	
Q2	1.2	0.7		0.2	0.6		0.3	3.4		0.1	0.6	
Q Average	5.9	6.7		2.0	6.2		2.2	18.4		1.1	7.3	
Q Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Q Storage	0	0		0	0		0	0		0	0	
Q S Ratio												
70th Percentile Output:												
fB%	1.2	1.2		1.2	1.2		1.2	1.2		1.2	1.2	
BOQ	7.0	7.9		2.4	7.4		2.7	21.4		1.3	8.7	
QSRatio												
85th Percentile Output:												
fB%	1.5	1.5		1.6	1.5		1.6	1.5		1.6	1.5	
BOQ	9.1	10.3		3.2	9.6		3.5	26.9		1.7	11.2	
QSRatio												
90th Percentile Output:												
fB%	1.7	1.7		1.8	1.7		1.8	1.6		1.8	1.7	
BOQ	10.0	11.3		3.5	10.5		3.9	28.7		1.9	12.3	
QSRatio												
95th Percentile Output:												
fB%	1.9	1.9		2.0	1.9		2.0	1.7		2.1	1.9	
BOQ	11.4	12.8		4.1	12.0		4.5	31.6		2.2	13.9	
QSRatio												
98th Percentile Output:												
fB%	2.3	2.3		2.6	2.3		2.5	1.9		2.6	2.3	
BOQ	13.8	15.4		5.1	14.4		5.7	35.8		2.8	16.6	
QSRatio												

ERROR MESSAGES

No errors to report.

Highway Capacity Analysis:

93rd Avenue and U.S. 41 PM Peak

APPENDIX 5

HCS+: Signalized Intersections Release 5.4

Analyst:
Agency:
Date: 9/21/2015
Period: pm peak
Project ID: US 41 and 93rd
E/W St: 93rd

Inter.:
Area Type: All other areas
Jurisd:
Year :

N/S St:

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	0	1	2	0	1	2	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Volume	182	171	116	145	172	72	189	702	88	94	1111	62
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A	A			NB Left	A	A	
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left	A	A			SB Left	A	A	
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	10.0	20.0				9.0	35.0	
Yellow	3.0	3.0				3.0	3.0	
All Red	1.0	1.0				1.0	1.0	

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	344	1770	0.58	0.38	23.0	C		
TR	389	1750	0.80	0.22	44.6	D	36.2	D
Westbound								
L	307	1770	0.51	0.38	22.0	C		
TR	396	1781	0.67	0.22	36.3	D	31.0	C
Northbound								
L	260	1770	0.79	0.53	34.6	C		
TR	1356	3487	0.63	0.39	23.3	C	25.5	C
Southbound								
L	318	1770	0.32	0.53	19.2	B		
TR	1369	3519	0.93	0.39	37.9	D	36.1	D

Intersection Delay = 32.1 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.4

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst:
Agency/Co.:
Date Performed: 9/21/2015
Analysis Time Period: pm peak
Intersection:
Area Type: All other areas
Jurisdiction:
Analysis Year:
Project ID: US 41 and 93rd
E/W St: 93rd N/S St:

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	182	171	116	145	172	72	189	702	88	94	1111	62
% Heavy Veh	2	2	2	2	2	2	2	2	2	2	2	2
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PK 15 Vol	49	46	32	39	47	20	51	191	24	26	302	17
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900		1900	1900		1900	1900	
ParkExist												
NumPark												
No. Lanes	1	1	0	1	1	0	1	2	0	1	2	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Lane Width	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			0			0			0			0
Adj Flow	198	312		158	265		205	859		102	1275	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs		0.404			0.294			0.112			0.053	
Peds Bikes		0			0			0			0	
Buses	0	0		0	0		0	0		0	0	
%InProtPhase	0.0			0.0			0.0			0.0		
Duration	0.25			Area Type: All other areas								

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Arriv. Type	3	3		3	3		3	3		3	3	
Unit Ext.	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext of g	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	A	A						
	Thru		A						
	Right		A						
	Peds								
WB	Left	A	A						
	Thru		A						
	Right		A						
	Peds								
NB	Right								
SB	Right								
NB	Left					A	A		
	Thru						A		
	Right						A		
	Peds								
SB	Left					A	A		
	Thru						A		
	Right						A		
	Peds								
EB	Right								
WB	Right								
Green		10.0	20.0			9.0	35.0		
Yellow		3.0	3.0			3.0	3.0		
All Red		1.0	1.0			1.0	1.0		

Cycle Length: 90.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	182	171	116	145	172	72	189	702	88	94	1111	62
PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj flow	198	186	126	158	187	78	205	763	96	102	1208	67
No. Lanes	1	1	0	1	1	0	1	2	0	1	2	0
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj flow	198	312		158	265		205	859		102	1275	
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs	0.404			0.294			0.112			0.053		

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	TR		L	TR		L	TR		L	TR	
So	1900	1900		1900	1900		1900	1900		1900	1900	
Lanes	1	1	0	1	1	0	1	2	0	1	2	0
fW	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fHV	0.980	0.980		0.980	0.980		0.980	0.980		0.980	0.980	
fG	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fP	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fBB	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fA	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fLU	1.000	1.000		1.000	1.000		1.000	0.952		1.000	0.952	
fRT		0.939			0.956			0.983			0.992	
fLT	0.950	1.000		0.950	1.000		0.950	1.000		0.950	1.000	
Sec.	0.296			0.222			0.103			0.174		
fLpb	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRpb		1.000			1.000			1.000			1.000	
S	1770	1750		1770	1781		1770	3487		1770	3519	
Sec.	551			413			191			325		

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot		197	1770	# 0.11	0.111	197	1.00
Perm		1	551	0.00	0.267	147	0.01
Left	L	198			0.38	344	0.58
Prot							
Perm							
Thru	TR	312	1750	# 0.18	0.22	389	0.80
Right							
Westbound							
Prot		158	1770	0.09	0.111	197	0.80
Perm		0	413	0.00	0.267	110	0.00
Left	L	158			0.38	307	0.51
Prot							
Perm							
Thru	TR	265	1781	0.15	0.22	396	0.67
Right							
Northbound							
Prot		177	1770	# 0.10	0.100	177	1.00
Perm		28	191	0.15	0.433	83	0.34
Left	L	205			0.53	260	0.79
Prot							
Perm							
Thru	TR	859	3487	0.25	0.39	1356	0.63
Right							
Southbound							
Prot		102	1770	0.06	0.100	177	0.58
Perm		0	325	0.00	0.433	141	0.00
Left	L	102			0.53	318	0.32
Prot							
Perm							
Thru	TR	1275	3519	# 0.36	0.39	1369	0.93
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.75
Total lost time per cycle, L = 16.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.91

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Del Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
L	0.58	0.38	20.6	1.000	344	0.17	2.4	0.0	23.0	C		
TR	0.80	0.22	33.1	1.000	389	0.35	11.5	0.0	44.6	D	36.2	D
Westbound												
L	0.51	0.38	20.5	1.000	307	0.12	1.5	0.0	22.0	C		
TR	0.67	0.22	32.0	1.000	396	0.24	4.3	0.0	36.3	D	31.0	C
Northbound												
L	0.79	0.53	19.6	1.000	260	0.34	14.9	0.0	34.6	C		
TR	0.63	0.39	22.3	1.000	1356	0.21	1.0	0.0	23.3	C	25.5	C
Southbound												
L	0.32	0.53	12.7	1.000	318	0.11	0.6	0.0	13.2	B		
TR	0.93	0.39	26.3	1.000	1369	0.45	11.6	0.0	37.9	D	36.1	D

Intersection delay = 32.1 (sec/veh) Intersection LOS = C

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 90.0 sec				
Total actual green time for LT lane group, G (s)	34.0	34.0	48.0	48.0
Effective permitted green time for LT lane group, g(s)	24.0	24.0	39.0	39.0
Opposing effective green time, go (s)	20.0	20.0	35.0	35.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	2	2
Adjusted LT flow rate, VLT (veh/h)	198	158	205	102
Proportion of LT in LT lane group, PLT	1.000	1.000	1.000	1.000
Proportion of LT in opposing flow, PLTo	0.00	0.00	0.00	0.00
Adjusted opposing flow rate, Vo (veh/h)	265	312	1275	859
Lost time for LT lane group, tL	4.00	4.00	4.00	4.00
Computation				
LT volume per cycle, LTC=VLTC/3600	4.95	3.95	5.13	2.55
Opposing lane util. factor, fLUo	1.000	1.000	0.952	0.952
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	6.63	7.80	16.74	11.28
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	0.0	0.0	0.0	0.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.78	0.78	0.61	0.61
gq, (see Exhibit C16-4,5,6,7,8)	12.08	14.68	32.58	18.40
gu=g-gq if gq>=gf, or =g-gf if gq<gf	11.92	9.32	6.42	20.60
n=Max(gq-gf)/2,0)	6.04	7.34	16.29	9.20
PTHo=1-PLTo	1.00	1.00	1.00	1.00
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00	1.00	1.00	1.00
EL1 (refer to Exhibit C16-3)	1.68	1.75	4.58	3.03
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.17	0.17	0.10	0.10
gdiff=max(gq-gf,0)	0.00	0.00	0.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.30	0.22	0.10	0.17
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.296	0.222	0.103	0.174

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET
for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 90.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				

Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000	
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo	1.000	1.000	0.952	0.952	
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.

* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.

** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.

For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				

OCCbicg
OCCr
Number of cross-street receiving lanes, Nrec
Number of turning lanes, Nturn
ApbT
Proportion right-turns, PRT
Proportion right-turns using protected phase, PRTA
Right turn adjustment, fRpb

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

		EBLT	WBLT	NBLT	SBLT
Cycle length, C	90.0 sec				
Adj. LT vol from Vol Adjustment Worksheet, v		198	158	205	102
v/c ratio from Capacity Worksheet, X		0.58	0.51	0.79	0.32
Protected phase effective green interval, g (s)		10.0	10.0	9.0	9.0
Opposing queue effective green interval, gq		12.08	14.68	32.58	18.40
Unopposed green interval, gu		11.92	9.32	6.42	20.60
Red time r=(C-g-gq-gu)		56.0	56.0	42.0	42.0
Arrival rate, qa=v/(3600(max[X,1.0]))		0.05	0.04	0.06	0.03
Protected ph. departure rate, Sp=s/3600		0.492	0.492	0.492	0.492
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)		0.31	0.30	0.32	0.17
XPerm		0.36	0.38	1.07	0.31
XProt		0.74	0.59	0.66	0.33
Case		1	1	3	1
Queue at beginning of green arrow, Qa		3.08	2.46	2.54	1.19
Queue at beginning of unsaturated green, Qu		0.66	0.64	1.86	0.52
Residual queue, Qr		0.00	0.00	0.15	0.00
Uniform Delay, d1		20.6	20.5	19.6	12.7

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00		20.6	0.00	0.0	0.0	23.0
TR	0.0	0.00	35.0	33.1	0.00	0.0	0.0	44.6
	0.0						0.0	
Westbound								
L	0.0	0.00		20.5	0.00	0.0	0.0	22.0
TR	0.0	0.00	35.0	32.0	0.00	0.0	0.0	36.3
	0.0						0.0	
Northbound								
L	0.0	0.00		19.6	0.00	0.0	0.0	34.6
TR	0.0	0.00	27.5	22.3	0.00	0.0	0.0	23.3
	0.0						0.0	
Southbound								
L	0.0	0.00		12.7	0.00	0.0	0.0	13.2
TR	0.0	0.00	27.5	26.3	0.00	0.0	0.0	37.9
	0.0						0.0	

Intersection Delay 32.1 sec/veh Intersection LOS C

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	TR		L	TR		L	TR		L	TR	
Init Queue	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Flow Rate	198	312		158	265		205	451		102	669	
So	1900	1900		1900	1900		1900	1900		1900	1900	
No.Lanes	1	1	0	1	1	0	1	2	0	1	2	0
SL	910	1750		812	1781		487	1831		596	1848	
LnCapacity	344	389		307	396		260	712		318	719	
Flow Ratio	0.2	0.2		0.2	0.1		0.4	0.2		0.2	0.4	
v/c Ratio	0.58	0.80		0.51	0.67		0.79	0.63		0.32	0.93	
Grn Ratio	0.38	0.22		0.38	0.22		0.53	0.39		0.53	0.39	
I Factor		1.000			1.000			1.000			1.000	
AT or PVG	3	3		3	3		3	3		3	3	
Pltn Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
PF2	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Q1	3.3	7.4		2.6	6.1		2.6	9.1		1.2	16.0	
kB	0.4	0.4		0.3	0.4		0.3	0.6		0.3	0.6	
Q2	0.5	1.4		0.4	0.8		1.0	0.9		0.2	4.4	
Q Average	3.8	8.8		3.0	6.8		3.6	10.1		1.4	20.4	
Q Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Q Storage	0	0		0	0		0	0		0	0	
Q S Ratio												
70th Percentile Output:												
fB%	1.2	1.2		1.2	1.2		1.2	1.2		1.2	1.2	
BOQ	4.5	10.4		3.5	8.1		4.3	11.9		1.7	23.7	
QSRatio												
85th Percentile Output:												
fB%	1.6	1.5		1.6	1.5		1.6	1.5		1.6	1.5	
BOQ	5.9	13.4		4.7	10.5		5.6	15.3		2.2	29.7	
QSRatio												
90th Percentile Output:												
fB%	1.7	1.7		1.7	1.7		1.7	1.6		1.8	1.5	
BOQ	6.5	14.5		5.2	11.5		6.2	16.6		2.5	31.6	
QSRatio												
95th Percentile Output:												
fB%	2.0	1.9		2.0	1.9		2.0	1.8		2.1	1.7	
BOQ	7.5	16.4		5.9	13.0		7.2	18.6		2.9	34.6	
QSRatio												
98th Percentile Output:												
fB%	2.4	2.2		2.5	2.3		2.5	2.2		2.6	1.9	
BOQ	9.2	19.4		7.4	15.6		8.8	21.8		3.6	39.0	
QSRatio												

ERROR MESSAGES

No errors to report.