#2014-60
Murphy's Oil Fuel Station – Special Use Permit, Final PUD Amendment and Plat of Subdivision Project Review for Planning and Zoning Commission

Meeting Date:	May 20, 2015
Requests:	Special Use Permit, Final PUD Amendment and Final Plat of Subdivision for a Murphy's Oil fuel station.
Location:	1205 S. Route 31
Acreage:	Approximately 1.06 acres
Zoning:	B-2 PUD General Commercial
Surrounding Properties:	North: B-2 PUD General Commercial (Goodwill and Pauly Toyota) South: B-2 PUD General Commercial (Wal-Mart) East: B-2 PUD General Commercial (Wal-Mart) West: E-5 Estate (Barn Nursery)
Staff Contact:	Elizabeth Maxwell (815.356.3615)

Background:

- Existing Use: The new lot to be created is currently a portion of Wal-Mart's parking lot.
- Previous Approvals:
  - In 2006 Murphy's Oil received preliminary PUD approval to build on the outlot now occupied by Chase Bank. Murphy's Oil decided not to move forward and that approval expired.

Development Analysis:

- Request: To subdivide a portion of the Wal-Mart parking lot and request a Special Use Permit and Final PUD Amendment to allow the Murphy's Oil Gasoline Service Station and Convenience Store with a Gasoline Electronic Pricing sign.
- Land Use: The land use map shows the area as Commerce. This land use designation is appropriate for this use as a gas station.
- Zoning: The site is zoned B-2 PUD. This is an appropriate zoning designation for a gas station.

Site Layout

- The new lot would be created at the northwest corner of the Wal-Mart parking lot.

- The northwest Murphy Oil Gas Station entrance drive off of the south leg of the Central Park / Lutter intersection lines up with the exit lane of the bank across the street and is signed and striped as a one-way eastbound entrance to the gas station property.
- The site has been designed so that fueling and delivery trucks leave the gas station property, exit to the east of the site, and either make their way back to the Access Drive (south leg of the Central Park / Lutter intersection) or rejoin traffic flow on Central Park near the Wal-Mart building and head west to the Illinois Route 31 / Rakow Road intersection.
- Exiting or entering the site from the east (Wal-Mart side) is through two existing parking lot drive aisles.

Building Elevations

- The convenience store is constructed of brick with EIFS trim. The elevations show a clear base, middle and top to the building.
- The petitioner has worked with staff to coordinate the design style and colors with the existing Wal-Mart building.
- The gas canopy has a peaked roof to match the Harris/BMO Bank and Wal-Mart.
- New buildings are required to meet at least 6 of the architectural design criteria; this building meets 9 of the criteria.
- The petitioner has wrapped the gas station columns in the same brick material as the building.

Parking

- Parking for a convenience store, gas station and car wash is as follows: 1/350 sq. ft. of convenience store space + 1 per 4 gas pumps. The building is 1400 square feet and there are 12 pumps, requiring a total of 7 parking spaces. The project has been designed with 8 parking spaces.
- This use would also have cross-access and cross-parking with the Wal-Mart. Wal-Mart currently has 912 parking spaces, 83 would be removed with this project, leaving 829 spaces. The reduction in parking would not result in a deficiency of available parking for Wal-Mart.

Landscape

- The landscape plan illustrates parking lot screening, perimeter screening, landscape islands and screening around the dumpster.
- As the site is being placed in an existing paved area, there was little room to create planter areas around the building for foundation base landscape; the petitioner has added this landscape around the perimeter of the site.
- The plan meets the ordinance requirements.

Signage

- The petitioner has illustrated signage on the convenience store building, the gas canopy, and the gas pumps. Although not shown, staff has added that a Gasoline Electronic Pricing Sign can be added on the site.
- The signage totals 176.82 square feet and stand-alone buildings are permitted 150 square feet of signage. A condition has been added that they meet the UDO requirements.

Environmental

- The petitioner has completed an Environmental Study and an Environmental Impact Statement for the property.
- The proposed gas station is within the Village of Cary's well-head protection area. Cary reviewed the plans and provided a letter which is attached and their comments are included in the conditions of approval.

Findings of Fact:

Final Planned Unit Development Amendment

The petitioner is requesting an amendment to a Final Planned Unit Development to allow the construction of a fuel station on a newly created parcel in the Wal-Mart shopping center. A Planned Unit Development is a Special Use and Special Uses require separate review because of their potential to impact surrounding properties and the orderly development of the City.

Section 2-400 B General Standards for all special uses in the Unified Ordinance establishes standards for all special uses in Crystal Lake. Briefly, the criteria are as follows:

1. The use is necessary or desirable, at the proposed location, to provide a service or facility which will further the public convenience and general welfare.
   ☐ *Meets* ☐ *Does not meet*

2. The use will not be detrimental to area property values.
   ☐ *Meets* ☐ *Does not meet*

3. The use will comply with the zoning districts regulations.
   ☐ *Meets* ☐ *Does not meet*

4. The use will not negatively impact traffic circulation.
   ☐ *Meets* ☐ *Does not meet*

5. The use will not negatively impact public utilities or municipal service delivery systems. If required, the use will contribute financially to the upgrading of public utilities and municipal service delivery systems.
   ☐ *Meets* ☐ *Does not meet*

6. The use will not negatively impact the environment or be unsightly.
   ☐ *Meets* ☐ *Does not meet*

7. The use, where possible will preserve existing mature vegetation, and provide landscaping and architecture, which is aesthetically pleasing, compatible or complementary to surrounding properties and acceptable by community standards.
   ☐ *Meets* ☐ *Does not meet*

8. The use will meet requirements of all regulating governmental agencies.
   ☐ *Meets* ☐ *Does not meet*

9. The use will conform to any conditions approved as part of the issued Special Use Permit.
   ☐ *Meets* ☐ *Does not meet*

10. The use will conform to the regulations established for specific special uses, where applicable.
    ☐ *Meets* ☐ *Does not meet*

In addition PUDs must also meet the standards in Section 4-500 C. Development Standards and 4-500 D. 2 Additional standards for Planned Unit Developments Commercial PUDs.

1. Implements the vision and land use policies of the Comprehensive Plan.
   ☐ *Meets* ☐ *Does not meet*

2. Shall not result in substantial adverse effect on adjacent property, natural resources, infrastructure, public sites or other matter of public health, safety and welfare.
   ☐ *Meets* ☐ *Does not meet*

3. PUD's must provide transitional uses to blend with adjacent development.
   ☐ *Meets* ☐ *Does not meet*

4. PUD phases must be logically sequenced.
   ☐ *Meets* ☐ *Does not meet*

5. The density and intensity of a PUD shall be in accordance with the Comprehensive Plan.
   ☐ *Meets* ☐ *Does not meet*

6. All dimensional standards shall be listed within the PUD plan if they do not meet the Ordinance minimum standards.
   ☐ *Meets* ☐ *Does not meet*

7. The responsible parties for all on-site and other required public improvements shall be established and a utility plan indicating all proposed easements shall be provided.
   ☐ *Meets* ☐ *Does not meet*

8. Any private infrastructure shall comply with the city standards.
   ☐ *Meets* ☐ *Does not meet*

9. The PUD plan shall establish the responsibility of the applicant/developer.
   ☐ *Meets* ☐ *Does not meet*

10. A bond or letter of credit shall be posted to cover required fees or public improvements.
    ☐ *Meets* ☐ *Does not meet*

Gasoline Stations have specific Special Use Criteria they have to meet. Gasoline stations must comply with the following standards:

1. Location: Gasoline stations are not permitted within the City's wellhead protection areas. Stations in the Crystal Lake watershed require a site specific analysis by the City's watershed consultant
   ☐ *Meets* ☐ *Does not meet*

2. Environmental impact: No gasoline station shall commence operations unless it has first provided an environmental impact statement from a qualified expert in the related field that the use will not negatively affect ground water resources or contaminate the soil.
   ☐ *Meets* ☐ *Does not meet*

3. Screening: Gasoline stations adjacent to residential properties shall provide an 6 foot tall solid screen consisting of a solid wooden fence, in accordance with the provisions of Article 4-700, Fences, Walls and Screening or opaque landscaping along the perimeters of the property abutting the residential district or use, in accordance with the provisions of Article 4-400, Landscaping and Screening Standards.
   ☐ *Meets* ☐ *Does not meet*

4. Canopy: Flat canopies are not permitted. Canopies must have a minimum 4:12 pitch (Amended per Ord. 6970, 11-5-2013).The edge of the pump canopy shall be setback at least 15 feet from all property lines.
   ☐ *Meets* ☐ *Does not meet*

5. Curb cuts: There shall be a maximum of 2 curb cuts per property. Corner lots shall be limited to 1 curb cut per street frontage. Curb cuts for corner lots shall be located at least 75 feet from the intersection, or as deemed appropriate by the City Engineer.
   ☐ *Meets* ☐ *Does not meet*

6. Vending machines: One vacuums and one air compressors shall be permitted on-site. Vending machines are treated as outside sales and display. Refer to the handout on Outdoor Sales, Service, Storage and Display available through the Planning and Economic Development Department for further clarification.
   ☐ *Meets* ☐ *Does not meet*

7. Outside sales: Outside product display and sales of seasonal items are prohibited. Propane tanks stored in 1 locked metal cage are not treated as outside sales and permitted subject to the approval of the City's Fire Prevention Bureau. For any other outside display and sales, refer to the handout on Outdoor Sales, Service, Storage and Display available through the Planning and Economic Development Department for further clarification.
   ☐ *Meets* ☐ *Does not meet*

8. Monitoring: Monitoring wells finished at appropriate depths and locations best suited to detect a contaminate plume are required to be designed and located by a groundwater

professional for stations within the Crystal Lake watershed or as determined by the City Engineer.

☐ *Meets* ☐ *Does not meet*

9. Electronic Pricing Signs: Electronic pricing signs must be requested as part of the Special Use Permit.

☐ *Meets* ☐ *Does not meet*

Outdoor Sales, Service, Storage or Display shall comply with the following standards. The petitioner is proposing outdoor storage for vehicles associated with the self-storage concept.

1. General: An on-site circulation pedestrian and vehicle plan, illustrating the location of the sales, service, storage or display area shall be provided.

☐ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

2. Site Design: Outdoor service or storage areas shall be located at the rear of the property. Special attention must be given to locate outdoor service or storage areas away from adjacent residential properties and at the least obtrusive location for adjacent commercial uses.

☐ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

3. Screening: All outside service or storage areas shall be screened from view with solid wooden fencing or opaque landscaping, in accordance with the standards in Article 4-700 Fences, Walls and Screening. The height of the fencing shall be adequate to conceal the stock, equipment or materials from view of adjacent properties. In cases where the height of materials exceeds 15 feet in height making it difficult to screen with fencing and landscaping, consideration will be given to the type of materials being stored and the impact of the visibility on the adjacent and surrounding property owners.

☐ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

4. Other applicable regulations: Written evidence, that applicable standards and requirements for health and safety protection and licensing by jurisdictions other than the City, as well as those required by the City ordinances, have been met shall be provided.

☐ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

5. All outdoor sales, service, storage and display must meet the Guidelines for Outdoor Sales, Service, Storage and Display that are included in the Appendix.

☐ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

DESIGN CRITERIA

The UDO specifies specific design criteria for new development. There are 10 criteria groups and the site must meet a minimum of 6 of those. Staff has reviewed the proposed development against the standards listed and has made a determination that the project meets 9 of 10 of the criteria. The results are as follows:

1. Building Form
   ☒ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

2. Building Massing and Articulation
   ☒ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

3. Rooflines and Parapets
   ☒ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

4. Building Materials
   ☒ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

5. Roof Materials
   ☒ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

6. Building Colors
   ☒ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

7. Building Fenestration
   ☒ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

8. Entrance Design
   ☒ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

9. Canopy/Awning Design
   ☐ *Meets* ☒ *Does not meet* ☐ *Not Applicable*

10. Overall Façade Design
    ☒ *Meets* ☐ *Does not meet* ☐ *Not Applicable*

Comprehensive Land Use Plan 2020 Vision Summary Review:

The Comprehensive Plan designates the subject property as Commerce, which allows for existing and future commercial and business uses. The following goals are applicable to this request:

Land Use – Commerce

Goal: Maintain a dynamic and sustainable base of commercial uses that provides a solid tax base, goods, services and jobs to the city as well as the surrounding region through coordination in the Unified Development Ordinance, Comprehensive Land Use Plan and Economic Development Strategic Plan.

This can be accomplished with the following supporting actions:

Supporting Action: Promote, retain and attract businesses that provide a diverse tax base.

Economic Development – Attract and Retain Businesses

Goal: Establish marketing efforts to attract and retain businesses throughout the City.

This can be accomplished with the following supporting actions:

Supporting Action: Continue to solicit the retail businesses which are most likely to succeed in various retail nodes in Crystal Lake.

Recommended Conditions:

If a motion is made to recommend approval of the petitioner's request, the following conditions are recommended:

1. Approved plans, to reflect staff and advisory board comments, as approved by the City Council:
   A. Application (CEI Engineering, received 03/16/15).
   B. Final Plat of Subdivision (Four Points Land Surveying, undated, received 04/28/15)
   C. Site and Landscape Plans [sheets C-1, 2, 4, 7 & 9] (CEI Engineering, dated 04/23/15, received 04/24/15)
   D. Elevations (BRR, dated 11/07/14, received 04/24/15)

2. Outside storage and sales need to comply with Guidelines for Outdoor Sales, Service, Storage and Display in the UDO, which requires a Limited Use Permit. There shall be no stand-alone water kiosk on the property, unless inside the building.

3. Elevations
   a. The building elevation shall be revised so that the stand-alone window bay does not go to the ground, but that the brick base continues through that area on both the left and right elevations.

4. Plat of Subdivision
   a. Amend the plat title to read Final Plat.
   b. Remove the IDOT signature block from the plat.
   c. A revised final plat shall be provided to the City with Owner, County Clerk and Surveyor/Surface Water Drainage certificates signed.

5. Comply with the recommendations of the traffic study dated March 2015, including:
   a. The eastbound right-turn lane at the Central Park / Lutter intersection should be widened and restriped to better accommodate traffic entering the intersection from the Illinois Route 31 / Rakow Road intersection.
   b. The striping within the gas station property lot that separates the inbound and outbound traffic at the southwest property entrance onto the Access Drive should be extended to better delineate traffic heading into and out of the site.
   c. The three parking spaces immediately adjacent to the southeast corner of the proposed gas station property, near the existing cart corral, should be removed upon further coordination with Wal-Mart.

6. Comply with the recommendations from the Village of Cary in their letter dated May 14, 2015, including:
   a. The detailed fuel storage tank and piping plans, including the means of containment and monitoring, should be reviewed to assure that the containment prevention facilities are suitable for this location. The tanks will sit in a sand and gravel formation that is approximately 90 feet thick with the water level approximately 45 feet below the surface. There will not be any groundwater in the tank excavation, but the geologic materials on this property will not significantly impede the movement of contamination if it is released. Given this geology, the tanks and piping should be set in a lines containment area with monitoring well within the containment zone.
   b. Walmart, the Murphy Oil fueling station, and other property owners at this location should have contingency plans in place for the quick containment of spills on the parking lot and service area surfaces. The owners should also have plans for minimizing the use of salts and chemicals that will be discharged into the drywells.
   c. A triple basin separator should be provided for the storm sewer collection system on this parcel upstream of the drywell to capture contaminated runoff before it enters the drywell. The triple basin separator should include a detection system for petroleum products and an alarm system.
   d. Any monitoring well should be installed in a location to best capture the directional flow of any downstream runoff materials.

7. The petitioner shall comply with all of the requirements of the Community Development, Fire Rescue, Police and Public Works Departments.

2014 60

City of Crystal Lake Development Application

Office Use Only
File # _____

RECEIVED
MAR 16 2015
BY:

Project Title: MURPHY FUEL CENTER

Action Requested

- ___ Annexation
- ___ Comprehensive Plan Amendment
- ___ Conceptual PUD Review
- X Final PUD
- ___ Final PUD Amendment
- ___ Final Plat of Subdivision
- X Preliminary PUD
- ___ Preliminary Plat of Subdivision
- ___ Rezoning
- ___ Special Use Permit
- ___ Variation
- ___ Other

Petitioner Information

Name: CEI ENGINEERING ASSOCIATES, INC.
Address: 3030 LBJ FREEWAY, SUITE 100
DALLAS, TX 75234
Phone: 972-488-3737
Fax: 972-488-6732
E-mail: JIBARRA@CEIENG.COM

Owner Information (if different)

Name: WAL-MART REAL ESTATE BUSINESS TRUST
Address: 2001 SE 10th ST.
BENTONVILLE, AR 72716
Phone: 479-204-3280
Fax:
E-mail:

Property Information

Project Description: THE PROJECT CONSISTS OF A FUEL CENTER WITH 4 MULTIPLE PUMP DISPENSERS (MPDs), 2 DIESEL DISPENSERS AND A CONVENIENCE STORE.

Project Address/Location: 1205 ILLINOIS ROUTE 31, CRYSTAL LAKE, IL
PROPOSED MURPHY FUEL CENTER IS LOCATED AT THE NORTHWEST CORNER OF THE WAL-MART PARCEL, AT THE INTERSECTION OF ILLINOIS ROUTE 31 AND CENTRAL PARK DRIVE.

PIN Number(s): 19-15-203-008

Development Team

Please include address, phone, fax and e-mail

Developer: MURPHY OIL USA, 422 N. WASHINGTON AVE., EL DORADO, AR 71730-7000 (870-881-6734)

Architect: GREENBERG FARROW, 1430 W. PEACHTREE ST. #200, ATLANTA, GA 30309 (404-601-4000) CCERBO@GREENBERGFARROW.COM

Attorney:

Engineer: CEI ENGINEERING, 3030 LBJ FREEWAY #100, DALLAS, TX 75234 (972-488-3737) JIBARRA@CEIENG.COM

Landscape Architect: CEI ENGINEERING, 3030 LBJ FREEWAY #100, DALLAS, TX 75234 (972-488-3737) JIBARRA@CEIENG.COM

Planner:

Surveyor: CB&M SURVEY'S, INC., 429 NE A ST., LINTON, IN 47441 (812-847-1952) JTIBBETT@CBMSURVEYS.COM

Other:

Signatures

Joshua D. Ibarra-CEI Engineering 3/13/2015

PETITIONER: Print and Sign name (*if different from owner*) **Date**

As owner of the property in question, I hereby authorize the seeking of the above requested action.

Nathan Hamblen, Nathan Hamblen, 3/12/2015

OWNER: Print and Sign name **Date**

Senior Realty Manager for Wal-Mart Real Estate Business Trust

NOTE: If the property is held in trust, the trust officer must sign this petition as owner. In addition, the trust officer must provide a letter that names all beneficiaries of the trust.

PUBLIC NOTICE

BEFORE THE PLANNING AND ZONING COMMISSION OF THE CITY OF CRYSTAL LAKE, MCHENRY COUNTY, ILLINOIS

IN THE MATTER OF THE PETITION OF
Wal-Mart Real Estate Business Trust

LEGAL NOTICE

Notice is hereby given in compliance with the Unified Development Ordinance of the City of Crystal Lake, Illinois that a public hearing will be held before the Planning and Zoning Commission upon the application of Wal-Mart Estate Business Trust, for a Final Planned Unit Development Amendment, Special Use Permit and a Plat of Subdivision relating to the property at 1205 S. Route in Crystal Lake, Illinois 60014. PIN: 19-15-203-008.

This application is filed for the purpose of seeking a Final Planned Unit Development Amendment, Final Plat of Subdivision and Special Use Permit to allow a Murphy's Oil fuel center with electronic message center sign and outdoor sales, service, storage and display, pursuant to Article 2-300, Article 2-400, Article 4-500, Article 4-1000, Article 5and Article 9-200 of the Unified Development Ordinance. Plans for this project can be viewed at the Crystal Lake Community Development Department at City Hall.

A public hearing before the Planning and Zoning Commission for this request will be held at 6:30 p.m. on Wednesday May 6, 2015, at the Crystal Lake City Hall, 100 West Woodstock Street, at which time and place any person determining to be heard may be present.

Tom Hayden, Chairperson
Planning and Zoning Commission
City of Crystal Lake

(Published in the Northwest Herald April 20, 2015.) NW 6388

MONTCALM DRIVE
LUTTER DRIVE
MEYER DRIVE
BOUNCE DRIVE
CENTRAL PARK DRIVE
PIQ
S ILLINOIS ROUTE 31
JAMES RANDALL ROAD
PALATINES COURT
MITCHELL COURT
MUNSHAW LANE

VILLAGE OF Cary

EST. 1893

May 14, 2015

City of Crystal Lake
Attn: Mr. James L. Richter II
100 W. Woodstock Street
Crystal Lake, IL 60014

RE: PROPOSED MURPHY'S OIL FUEL CENTER IN CRYSTAL LAKE

Dear Mr. Richter,

I would like to thank you for giving the Village of Cary the opportunity to review and comment on the proposed Murphy's Oil fueling station within the City of Crystal Lake. As you are aware, the Village of Cary previously provided comments on a similar proposal in 2007 because the fueling station was located within the area that recharges water to the aquifer which supplies three of Cary's wells. These water supply wells are each approximately 160 feet deep and use the shallow sand and gravel aquifer that underlies this area. The Village's long term plans are to drill another well in this area when demand is warranted. Although the subject facility is proposed for a different location than the 2007 project, the new site is still considered to be in the area which feeds the same aquifer.

A letter regarding the previous proposal was provided to the City of Crystal Lake on May 16, 2007, which included certain recommendations for consideration in the development of the fueling station. Staff believes that these recommendations would still apply in this instance. The Village of Cary would request that you therefore consider the following as part of your development approvals for the project:

1. The detailed fuel storage tank and piping plans, including the means of containment and monitoring, should be reviewed to assure that the contamination prevention facilities are suitable for this location. The tanks will sit in a sand and gravel formation that is approximately 90 feet thick with the water level approximately 45 feet below the surface. There will not be any groundwater in the tank excavation, but the geologic materials on this property will not significantly impede the movement of contamination if it is released. Given this geology, the tanks and piping should be set in a lined containment area with monitoring wells within the containment zone.
2. Walmart, the Murphy Oil fueling station, and other property owners at this location should have contingency plans in place for the quick containment of spills on the parking lot and service area surfaces. The owners should also have plans for minimizing the use of salts and chemicals that will be discharged into the drywells.
3. A triple basin separator should be provided for the storm sewer collection system on this parcel upstream of the drywell to capture contaminated runoff before it enters the drywell. The triple basin separator should include a detection system for petroleum products and an alarm system.

655 VILLAGE HALL DRIVE
CARY, ILLINOIS 60013-2599
847.639.0003 FAX 847.639.2761
VILLAGEHALL@CARYILLINOIS.COM
WWW.CARYILLINOIS.COM

4. A monitoring well should be installed in a location to best capture the directional flow of any downstream runoff materials.

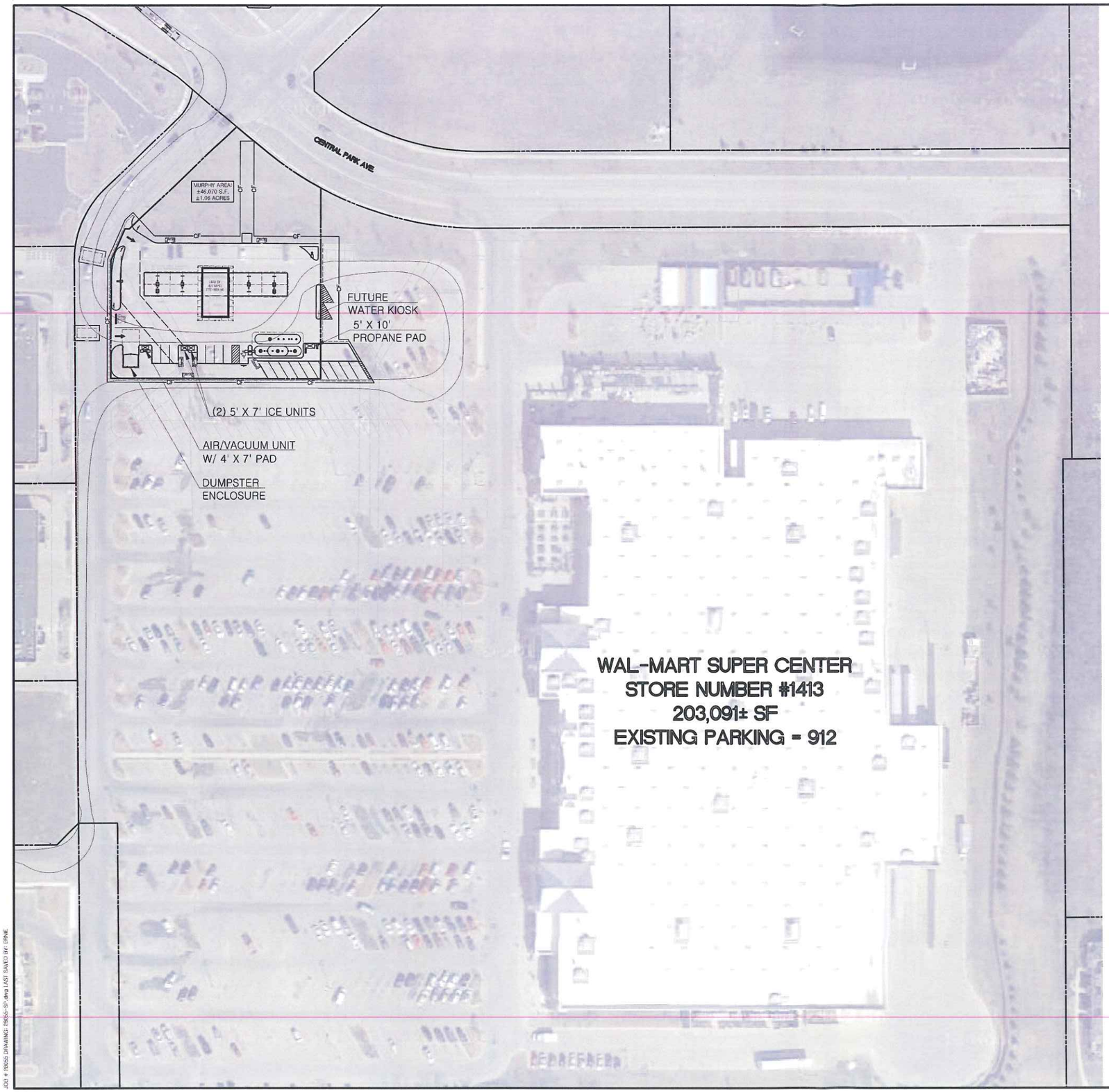
Please contact me directly at (847) 639-1100 should you have any questions regarding this matter and the Village's recommendations discussed above.

Sincerely,

VILLAGE OF CARY

Brian Simmons, AICP
Director of Community Development

M:\Staff folders\Staff folder - Simmons\Letters\City of Crystal Lake - Murphy's Oil_051415.docx



0 50' 75' 100'
SCALE IN FEET

RECEIVED
APR 24 2015
BY: 2014-60

WATER KIOSK REQUIRES ADDITIONAL APPROVAL FROM WAL-MART BEFORE INSTALLATION

NOTES

A. PROPOSED LOCATION IS AN
- ☐ OUT PARCEL
- ☑ EXISTING PARKING AREA
- ☐ GRASSY AREA
- ☐ FUTURE LEASE LOT

B. PARKING

912/4.49 EXISTING NUMBER OF PARKING SPACES / RATIO ON WAL-MART PARCEL
83 TOTAL NUMBER OF SPACES TO BE REMOVED FROM WAL-MART PARCEL
829/4.08 TOTAL NUMBER OF POST GAS SPACES REMAINING ON WAL-MART PARCEL / RATIO
203,091 WAL-MART BUILDING SQUARE FOOTAGE- (GROSS SQ-FT)

C. TYPE OF STATION OPERATION:

1,400 C-STORE 4/2 MPD 24'X149' CANOPY SIZE
N/A KIOSK N/A MPD N/A CANOPY SIZE

D. PROPOSED SQUARE FOOTAGE OF OUT PARCEL AREA:

46,070 S.F 1.06 ACREAGE
PERCENTAGE OF OUTLOT USED: 67.86

E. ZONING REQUIREMENTS:

B-2(PUD) EXISTING ZONING
B-2(PUD) ZONING REQUIREMENTS FOR STATION
N/A PROPOSED ZONING CHANGES
YES RE-PLAT

F. PROPOSED UTILITY EASEMENTS: ANSWER "YES" OR "NO" AND PARTIES INVOLVED:

NO WATER
- N/A PUBLIC WITH N/A
- N/A PRIVATE WITH WAL-MART N/A
- N/A PRIVATE WITH 3RD PARTY N/A

YES SEWER
- 20' PUBLIC WITH CITY OF CRYSTAL LAKE
- N/A PRIVATE WITH WAL-MART N/A
- N/A PRIVATE WITH 3RD PARTY N/A

NO UNDERGROUND ELECTRIC
- N/A PUBLIC WITH N/A
- N/A PRIVATE WITH WAL-MART N/A
- N/A PRIVATE WITH 3RD PARTY N/A

NO UNDERGROUND TELEPHONE
- N/A PUBLIC WITH N/A
- N/A PRIVATE WITH WAL-MART N/A
- N/A PRIVATE WITH 3RD PARTY N/A

G. OTHER NOTES:

1. HEAVY DUTY PAVING HAS BEEN PROVIDED.
2. TRUCK ROUTE WAS DETERMINED USING AUTO-TURN WITH A WB-50 AS ITS VEHICLE.
3. WAL-MART STORE SQUARE FOOTAGE PROVIDED BY WAL-MART PER EMAIL RECEIVED BY CEI ENGINEERING ON 12/03/2014.

SHEET NO. C-1

REV-1 | 4/23/15 | LWY | JDI | ERN | ERN
DATE | PRN | PM | DES | DRW

CSP
WAL-MART SUPERCENTER # 1413
1205 ILLINOIS ROUTE 31
CRYSTAL LAKE ILLINOIS

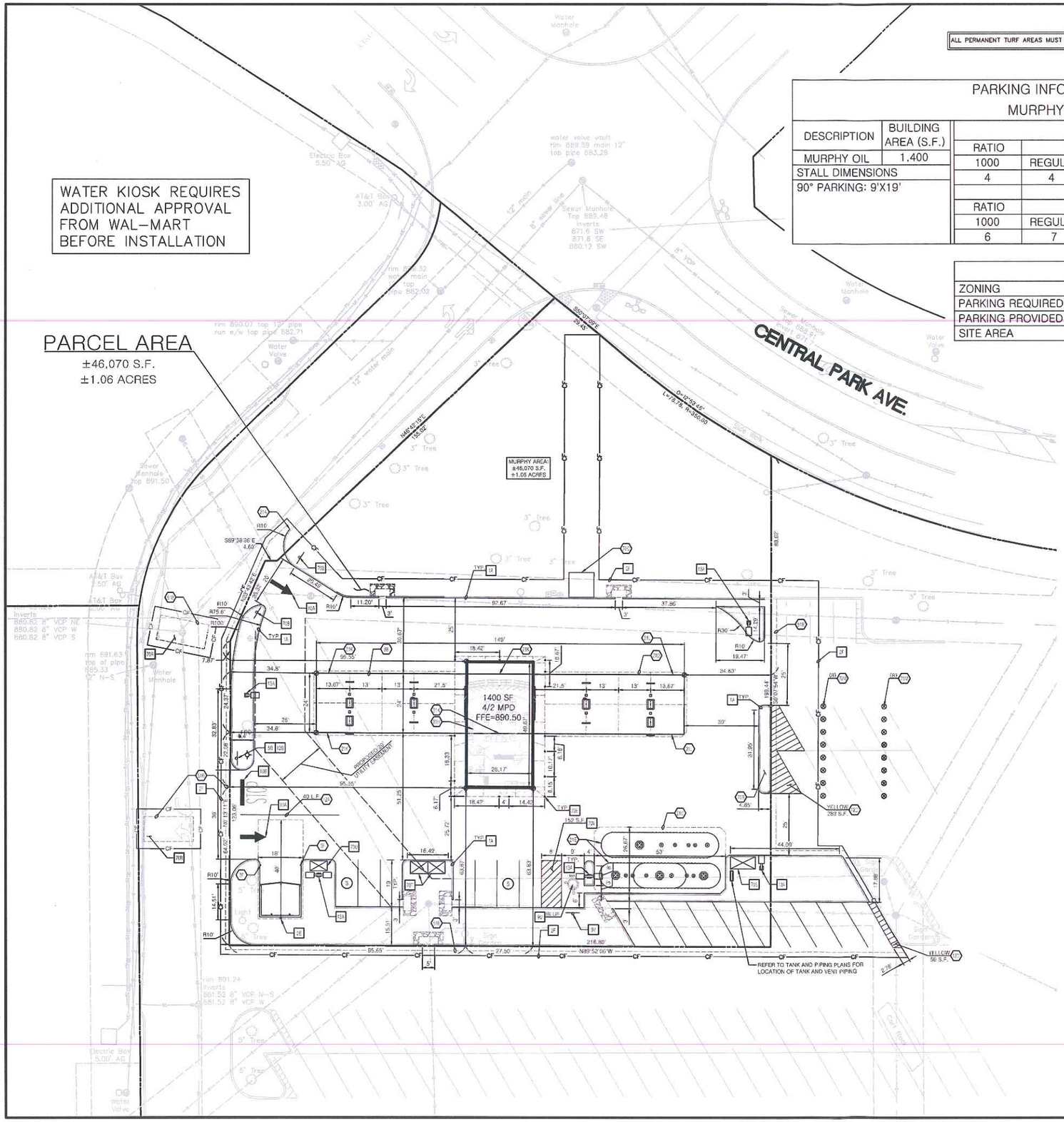
Engineering Associates, Inc.
ENGINEERS PLANNERS SURVEYORS
LANDSCAPE ARCHITECTS • ENVIRONMENTAL SCIENTISTS
3031 FM Freeway, Suite 100 (972)488-7777
Dallas, TX 75234 FAX (972)488-6322
JOB NO.: 28055 DWG NAME: 28055-SP

MURPHY OIL U.S.A. INC.
422 N WASHINGTON AVE.
P.O. BOX 7000
EL DORADO, AR 71730-7000

MURPHY USA

© 2015 CEI ENGINEERING ASSOCIATES, INC.

JOB # 28055 DRAWING: 28055-SP.dwg LAST SAVED BY: ERNIE



ALL PERMANENT TURF AREAS MUST BE SODDED

SITE BENCHMARK
THE TBM IS LOCATED IN THE SOUTHEAST CORNER OF THE MAPPING MARKED TBM CUT CROSS IN CURB ELEV 891.17 THIS IS A NAVD 88 DATA

PARKING INFORMATION
MURPHY OIL

DESCRIPTION	BUILDING AREA (S.F.)
MURPHY OIL	1,400
STALL DIMENSIONS	
90° PARKING: 9'X19'	

REQUIRED:

RATIO	SPACES			
1000	REGULAR	ACCESSIBLE	VAN ACCESSIBLE	TOTAL
4	4		1	5

PROVIDED:

RATIO				
1000	REGULAR	ACCESSIBLE	VAN ACCESSIBLE	TOTAL
6	7		1	8

SITE DATA TABLE	
ZONING	B-2 (PUD)
PARKING REQUIRED	1 PER 4 PUMPS + 1/350 S.F. = 5 SPACES
PARKING PROVIDED	8 SPACES
SITE AREA	46,070 SF / 1.06 AC

1. THE MURPHY STATION WILL NOT DROP THE WAL-MART GREEN SPACE BELOW CITY REQUIREMENTS.
2. ALL PERMANENT TURF AREAS MUST BE SODDED.
3. GC TO ENSURE THAT TRAFFIC THROUGH MAIN WAL-MART DRIVES IS NOT INTERRUPTED AT ANY TIME DUE TO CONSTRUCTION ACTIVITIES. ENSURE A MINIMUM TEMPORARY LANE WIDTH OF 10' (EACH DIRECTION) IS AVAILABLE AT ALL TIMES, FREE OF OBSTRUCTIONS TO VEHICLES. AT NO TIME SHALL THE CONSTRUCTION FENCE EXTEND INTO THE DRIVE MORE THAN 2' FROM THE FACE OF THE CURB OR DRIVE.
4. IF DEMOLITION OR CONSTRUCTION ON SITE WILL INTERFERE WITH THE WAL-MART TRAFFIC FLOW OR ADJACENT PROPERTY OWNER'S TRAFFIC FLOW, THE CONTRACTOR SHALL COORDINATE WITH THE WAL-MART CONSTRUCTION/STORE MANAGER AND/OR ADJACENT PROPERTY OWNER, TO MINIMIZE THE IMPACT ON TRAFFIC FLOW. TEMPORARY RE-ROUTING OF TRAFFIC IS TO BE ACCOMPLISHED BY USING DOT APPROVED TRAFFIC BARRICADES, BARRELS, AND/OR CONES. TEMPORARY SIGNAGE AND FLAGMEN MAY BE ALSO NECESSARY.
5. ALL WAL-MART PROPERTY DAMAGED DUE TO CONSTRUCTION ACTIVITIES MUST BE REPLACED/RESTORED TO MATCH THE EXISTING TYPE AND QUALITY OF WORK AND MATERIALS, AND IS SUBJECT TO WAL-MART APPROVAL.
6. UTILITY WORK DONE ON WAL-MART PARCEL, WHETHER BY THE GC, CITY OR THE UTILITY COMPANIES, SHALL BE REPAIRED BACK TO EXISTING CONDITIONS.
7. EROSION CONTROL MEASURES IMPLEMENTED INSIDE THE WAL-MART DRIVE ISLES AND PARKING LOT SHALL INCLUDE ONLY SILT BAGS (OR WAL-MART PRE-APPROVED EQUAL) TO ENSURE TRAFFIC CIRCULATION IS NOT IMPEDED. GRAVEL INLET PROTECTION DEVICES SHALL NOT BE ALLOWED INSIDE THE WAL-MART DRIVE ISLES OR PARKING LOT.

TEMPORARY ACCESS DRIVE NOTES

1. INSTALL TEMPORARY ACCESS DRIVE AS SHOWN.
2. TEMPORARY ACCESS DRIVE SHALL REMAIN OPEN UNTIL PERMANENT ACCESS DRIVE IS COMPLETE.
3. THE PERMANENT ACCESS DRIVE SHALL BE COMPLETE WITH THREE (3) WEEKS.
4. TEMPORARY TRAFFIC BARRELS SHALL BE CONSTRUCTED OF LIGHTWEIGHT, DEFORMABLE MATERIALS. THEY SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT AND HAVE AT LEAST AN 18-INCH MINIMUM WIDTH REGARDLESS OF ORIENTATION. METAL DRUMS SHALL NOT BE USED. THE MARKINGS ON DRUMS SHALL BE HORIZONTAL, CIRCUMFERENTIAL, ALTERNATING ORANGE AND WHITE RETROREFLECTIVE STRIPES 4 TO 6 INCHES WIDE. EACH BARREL/DRUM SHALL HAVE A MINIMUM OF TWO ORANGE AND TWO WHITE STRIPES WITH THE TOP STRIPE BEING ORANGE. ANY NON-RETROREFLECTORIZED SPACES BETWEEN THE HORIZONTAL ORANGE AND WHITE STRIPES SHALL NOT EXCEED 3 INCHES WIDE. DRUMS SHALL HAVE CLOSED TOPS THAT WILL NOT ALLOW COLLECTION OF CONSTRUCTION DEBRIS OR OTHER DEBRIS.
5. CONTRACTOR TO INSTALL TEMPORARY TRAFFIC SIGNAGE FOR TEMPORARY ACCESS DRIVE.
6. CONSTRUCTION FENCE AROUND PERMANENT DRIVE TO BE INSTALLED DURING CONSTRUCTION OF THE DRIVE AND REMOVED AFTER COMPLETION OF THE DRIVE.

SITE DETAILS – SEE DETAIL SHEETS

1A	INTEGRAL CONCRETE CURB
2E	MASONRY DUMPSTER ENCLOSURE
2F	CONSTRUCTION FENCE
5B	TRAFFIC SIGN IN BOLLARD
9J	ACCESSIBLE PARKING SYMBOL (SEE PAINT COLOR INDICATED AT SYMBOL)
9V	ACCESSIBLE PARKING SIGN
10A	TRAFFIC FLOW ARROW (TYP.)
10B	STOP BAR (TYP.)
12G	"STOP" SIGN
13A	LIGHT POLE BASE (SEE PHOTOMETRIC PLAN FOR TYPE)
70B	"DO NOT ENTER" SIGN
70E	GUARD POST (SINGLE)
70R	ASPHALT STREET OR DRIVE CUT/REPAIR FOR NEW PIPE INSTALLATIONS
70S	PROPANE SLAB
70T	ICE MACHINE SLAB
70U	AIR/VAC MOUNTING SLAB
70V	TYPICAL HANDICAP ACCESSIBLE PARKING STALL (PER CRYSTAL LAKE STANDARD DETAIL, TR-06).

SITE NOTES

2F	DRILL (2) 3/4" X 5/8" DIA. HOLES (1) EACH FOR OPEN POSITION & CLOSED POSITION OF GATES. TO BE USED ON BOTH SIDES OF GATE. SEE DUMPSTER DETAIL.
8B	OVERHEAD CANOPY – (TYP. PER ARCH. PLANS).
12A	4 INCH TRAFFIC YELLOW LANE STRIPE (SEE LENGTH INDICATED AT SYMBOL).
12D	4 INCH WIDE PAINTED STRIPES. 2.0 FOOT O.C. @ 45 DEGREES (SEE SIZE INDICATED AT SYMBOL).
21A	TAPER CURB TO MATCH EXISTING CURB.
21D	EDGE OF CONCRETE SLAB (PER TANK AND PIPING PLAN).
21E	UNDERGROUND STORAGE TANKS
21H	ATM LOCATION.
21K	MURPHY ID SIGN.
21L	PRICE SIGN
51B	LIMITS OF SAWCUT AND PAVEMENT REMOVAL.
70B	FUTURE WATER KIOSK (REQUIRES ADDITIONAL APPROVAL FROM WAL-MART BEFORE INSTALLATION).
70C	TRANSFORMER PAD (PER ELEC. CO. AND/OR ARCH. PLAN)
70M	TEMPORARY TRAFFIC BARRELS

811 Know what's below. Call before you dig.

N

0 20' 30' 40'
SCALE IN FEET

EXISTING

- REBAR WITH CAP ENGRAVED JAMES TIDDETT LS 8332
- MAG NAIL SET OR PREVIOUSLY SET
- NAIL FOUND
- RAIL ROAD SPIKE SET OR PREVIOUSLY SET
- RAIL ROAD SPIKE FOUND
- REBAR FOUND
- CHISELED CROSS FOUND OR SET
- IRON PIN FOUND
- LIGHT POLE (WITH BULBS SHOWN IN NUMBER & ORIENTATION)
- MEASURED
- RECORDED
- POWER POLE
- SIGN – "WORDING"
- STORM DRAINS
- TREE
- FIRE HYDRANT
- MANHOLE
- SPRINKLER
- IRRIGATION CONTROL BOX
- BORE HOLE
- WATER VALVE
- STOP SIGN
- BASE OF CURB ELEV. TOP OF CURB ELEV.
- SPOT ELEVATION

NOT ALL SYMBOLS OR LAYERS ARE NECESSARILY IN THE DRAWING

LINE TYPES

- UNDERGROUND ELECTRIC LINE
- WATER LINE
- GAS LINE
- STORM LINE
- SANITARY SEWER LINE
- FIBER OPTICS LINE OR CONDUIT
- PROPERTY LINE
- ADJACENT PROPERTY LINE
- EASEMENT LINE
- SETBACK LINE
- CONTOUR LINE (1 FOOT)
- INDEX CONTOUR LINE (10 FOOT)

PROPOSED

- BOUNDARY LINE
- CONCRETE CURB AND GUTTER
- CONSTRUCTION FENCE
- BUILDING CONTROL POINT

GENERAL SITE NOTES

A. ALL DIMENSIONS SHOWN ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.

B. ALL CURB RETURN RADII SHALL BE 2', AS SHOWN TYPICAL ON THIS PLAN, UNLESS OTHERWISE NOTED.

C. UNLESS OTHERWISE SHOWN, CALLED OUT OR SPECIFIED HEREON

PAVEMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE PAVING PLAN OVER THE ENTIRE PARKING LOT AREA AND ALL APPROACH DRIVES.

SEE ASSOCIATED PLANS FOR CANOPY, COLUMN, PUMP ISLAND DETAILS AND LAYOUT.

D. CONTRACTOR SHALL BEGIN CONSTRUCTION OF ANY LIGHT POLE BASES FOR RELOCATED LIGHT FIXTURES AND RELOCATION OF ELECTRICAL SYSTEM AS SOON AS DEMOLITION BEGINS. CONTRACTOR SHALL BE AWARE THAT INTERRUPTION OF POWER TO ANY LIGHT POLES OR SIGNS SHALL NOT EXCEED 24 HOURS.

E. IF DEMOLITION OR CONSTRUCTION ON SITE WILL INTERFERE WITH THE WAL-MART TRAFFIC FLOW OR ADJACENT PROPERTY OWNER'S TRAFFIC FLOW, THE CONTRACTOR SHALL COORDINATE WITH THE WAL-MART CONSTRUCTION/STORE MANAGER AND/OR ADJACENT PROPERTY OWNER, TO MINIMIZE THE IMPACT ON TRAFFIC FLOW. TEMPORARY RE-ROUTING OF TRAFFIC IS TO BE ACCOMPLISHED BY USING DOT APPROVED TRAFFIC BARRICADES, BARRELS, AND/OR CONES. TEMPORARY SIGNAGE AND FLAGMEN MAY BE ALSO NECESSARY.

F. ALL WAL-MART PROPERTY DAMAGED DUE TO CONSTRUCTION ACTIVITIES MUST BE REPLACED/RESTORED TO MATCH THE EXISTING TYPE AND QUALITY OF WORK AND MATERIALS, AND IS SUBJECT TO WAL-MART APPROVAL.

G. CONTRACTOR TO PROTECT EXISTING LANDSCAPE/IRRIGATION MATERIAL.

H. THE MURPHY STATION WILL NOT DROP THE WAL-MART GREEN SPACE BELOW CITY REQUIREMENTS.

I. CONTRACTOR IS TO VERIFY LOCATION OF WAL-MART IRRIGATION SYSTEM, VALVE BOXES, CONTROL BOXES, BACKFLOW PREVENTION DEVICES AND OTHER ITEMS WHICH ARE PART OF THE SYSTEM. IF DAMAGES THEY MUST BE REPAIRED AT CONTRACTOR'S COST.

J. THE LOCATION OF THE CONSTRUCTION FENCE ON THE DRAWINGS IS FOR GRAPHICAL REPRESENTATION ONLY. THE CONTRACTOR IS TO ENSURE THAT THE CONSTRUCTION FENCE ENCOMPASSES THE ENTIRE WORK AREA.

K. CONTRACTOR TO ENSURE THAT LIGHT POLES AND ACCESSIBLE PARKING SIGNS ARE AT LEAST 2' FROM BACK OF CURB TO PREVENT VEHICLES FROM STRIKING THE LIGHT POLE OR ACCESSIBLE PARKING SIGN.

L. ALL TRAFFIC MARKING COLORS SHALL MATCH WAL-MART PARKING LOT.

M. CONTRACTOR TO COORDINATE LOCATION OF MAILBOX WITH MURPHY CONSTRUCTION MANAGER AND/OR ON-SITE REPRESENTATIVE.

SHEET NO. C-2

REV-1	DATE	LWY	PRN	JDI	PM	ERN	DES	ERN	DRW
	4/23/15								

SITE
WAL-MART SUPERCENTER # 1413
1205 ILLINOIS ROUTE 31
CRYSTAL LAKE ILLINOIS

MURPHY OIL U.S.A. INC.
422 N WASHINGTON AVE.
P.O. BOX 7000
EL DORADO, AR 71730-7000

CEI Engineering Associates, Inc.
ENGINEERS • PLANNERS • SURVEYORS
LANDSCAPE ARCHITECTS • ENVIRONMENTAL SCIENTISTS
3030 LBJ Freeway, Suite 1100, Dallas, TX 75234
(972)488-3137 FAX (972)488-6732
JOB NO.: 28055
DWG NAME: 28055-SP

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JOB # 28055 DRAWING: 28055-SP.dwg LAST SAVED BY: FINNE

ALL PERMANENT TURF AREAS MUST BE SODDED

SITE BENCHMARK
THE TBM IS LOCATED IN THE SOUTHEAST CORNER OF THE MAPPING MARKED TBM CUT CROSS IN CURB ELEV 891.17 THIS IS A NAVD 88 DATA

Know what's below. Call before you dig.

0 20' 30' 40'
SCALE IN FEET

CENTRAL PARK AVE.

EXISTING

- REBAR WITH CAP ENGRAVED JAMES TIBBETT LS 8332
- MAG NAIL SET OR PREVIOUSLY SET
- NAIL FOUND
- RAIL ROAD SPIKE SET OR PREVIOUSLY SET
- RAIL ROAD SPIKE FOUND
- REBAR FOUND
- CHISELED CROSS FOUND OR SET
- IRON PIN FOUND
- LIGHT POLE (WITH BULBS SHOWN IN NUMBER & ORIENTATION)
- MEASURED
- RECORDED
- POWER POLE
- SIGN - "WORDING"
- STORM DRAINS
- TREE
- FIRE HYDRANT
- MANHOLE
- SPRINKLER
- IRRIGATION CONTROL BOX
- BORE HOLE
- WATER VALVE
- STOP SIGN
- 123.45 / 125.45 BASE OF CURB ELEV, TOP OF CURB FLEV,
- + 123.45 SPOT ELEVATION

NOT ALL SYMBOLS OR LAYERS ARE NECESSARILY IN THE DRAWING

LINE TYPES

- UNDERGROUND ELECTRIC LINE
- WATER LINE
- GAS LINE
- STORM LINE
- SANITARY SEWER LINE
- FIBER OPTICS LINE OR CONDUIT
- PROPERTY LINE
- ADJACENT PROPERTY LINE
- EASEMENT LINE
- SETBACK LINE
- CONTOUR LINE (1 FOOT)
- INDEX CONTOUR LINE (10 FOOT)

PROPOSED

- BOUNDARY LINE
- GRADE BREAK
- XX CONTOUR ELEVATIONS
- XX.XX / XX.XX SPOT ELEVATIONS:
  TC XX.XX = TOP OF CURB
  EG XX.XX = EXISTING GRADE
  TOI XX.XX = TOP OF ISLAND
  FG XX.XX = TOP OF WALL
  IE XX.XX = INVERT ELEVATION
- XX% FLOW ARROW
- CF CONSTRUCTION FENCE
- PROPOSED STORM PIPE
- PROPOSED JUNCTION BOX

GRADING NOTES

18D MATCH EXISTING PAVEMENT ELEVATIONS.
31A LOCATION FOR THIS UTILITY AS SHOWN IS FOR DRAWING PURPOSES ONLY. CONTRACTOR SHALL VERIFY THE EXACT LOCATION IN THE FIELD PRIOR TO THE CONSTRUCTION OF THE PROPOSED UTILITY LINE TO BE CONNECTED. CONTRACTOR SHALL NOTIFY CEI ENGINEERING ASSOCIATES, INC. IF THE DESIGN AS SHOWN IS NOT ACHIEVABLE.
51B LIMITS OF SAWCUT AND PAVEMENT REMOVAL.
73A CONNECT TO EXISTING STORM DRAIN MANHOLE OR INLET.

GRADING DETAILS – SEE DETAIL SHEETS

28A STORM SEWER TRENCH AND BEDDING
73A CURB CUT
73C JUNCTION BOX
73J DOWNSPOUT COLLECTOR

GENERAL GRADING NOTES

A. PRIOR TO INSTALLATION OF STORM OR SANITARY SEWER, WATER MAIN OR ANY OTHER UTILITIES, THE CONTRACTOR SHALL EXCAVATE, VERIFY, AND CALCULATE ALL POINTS OF CONNECTION AND ALL UTILITY CROSSINGS AND INFORM THE OWNER AND THE ENGINEER OF ANY CONFLICTS OR REQUIRED DEVIATIONS FROM THE PLAN PRIOR TO CONSTRUCTION. NOTIFICATION SHALL BE MADE A MINIMUM OF 72 HOURS PRIOR TO CONSTRUCTION, THE ENGINEER AND ITS CLIENTS SHALL BE HELD HARMLESS IN THE EVENT THAT THE CONTRACTOR FAILS TO MAKE SUCH NOTIFICATION.

B. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED SMOOTH AND FOUR INCHES OF TOPSOIL APPLIED. IF ADEQUATE TOPSOIL IS NOT AVAILABLE ON SITE, THE CONTRACTOR SHALL PROVIDE TOPSOIL APPROVED BY THE OWNER, AS NEEDED. THE AREA SHALL THEN BE SEEDED/SODDED, FERTILIZED, MULCHED, WATERED AND MAINTAINED UNTIL HARDY GRASS GROWTH IS ESTABLISHED IN ALL AREAS. ANY RELOCATED TREES SHALL BE MAINTAINED UNTIL SUCH POINT AS TREE IS RE-ESTABLISHED. ANY AREAS DISTURBED FOR ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE PROJECT SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

C. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES.

D. CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE PROPOSED GRADES SHOWN ON THESE PLANS ARE NOT FROM AN AS-BUILT SURVEY. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR WILL BE RESPONSIBLE FOR VERIFYING EXISTING ELEVATIONS BEFORE COMMENCING CONSTRUCTION. EXISTING AND PROPOSED CONTOURS ARE FOR REFERENCE ONLY.

E. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION OF THE CONSTRUCTION TRAILER AND FENCING SHALL NOT AFFECT THE WAL-MART TRAFFIC FLOW.

F. CONTRACTOR TO FIELD VERIFY ELEVATIONS OF PROPOSED DRAINAGE STRUCTURES AND ADJACENT PAVEMENT CONSTRUCTED BY WAL-MART PRIOR TO STARTING CONSTRUCTION.

G. REFER TO GEOTECHNICAL REPORT FOR SPECIFIC SITE SOIL CONDITIONS AND CONSIDERATIONS.

H. CONTRACTOR SHALL COMPLY COMPLETELY WITH THE LATEST STANDARDS OF OSHA DIRECTIVES OR ANY OTHER AGENCY HAVING JURISDICTION FOR EXCAVATION AND TRENCHING PROCEDURES. THE CONTRACTOR SHALL USE SUPPORT SYSTEMS, SLOPING, BENCHING AND OTHER MEANS OF PROTECTION. THIS IS TO INCLUDE, BUT NOT LIMITED FOR ACCESS AND EGRESS FROM ALL EXCAVATION AND TRENCHING. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH PERFORMANCE CRITERIA AS REQUIRED BY OSHA.

I. CONTRACTOR SHALL TAKE ALL APPROPRIATE MEASURES TO KEEP SEDIMENT FROM ENTERING THE WAL-MART PARKING AREA AND ENSURE THAT THE PARKING AREA IS KEPT CLEAN.

SHEET NO. C-4

REV-1

GRADING
WAL-MART SUPERCENTER # 1413
1205 ILLINOIS ROUTE 31
CRYSTAL LAKE ILLINOIS

DATE	PRN	PM	DES	DRW
4/15/15	LWY	JDJ	ERN	ERN

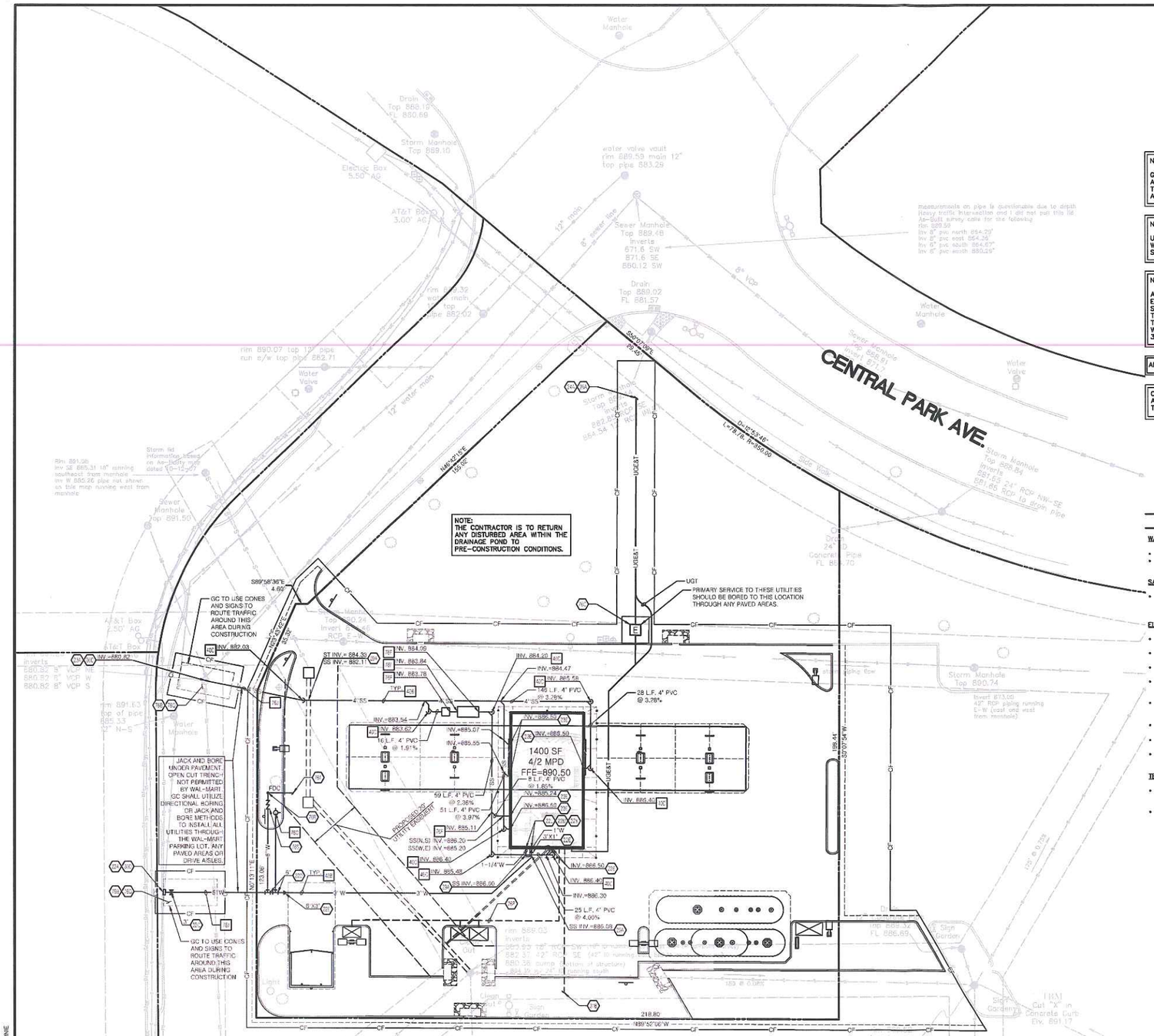
CEI Engineering Associates, Inc.
ENGINEERS · PLANNERS · SURVEYORS · ENVIRONMENTAL SCIENTISTS
3030 LBJ Freeway, Suite 1600, Dallas, TX 75234
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DWG NAME: 28055-GP JOB NO.: 28055

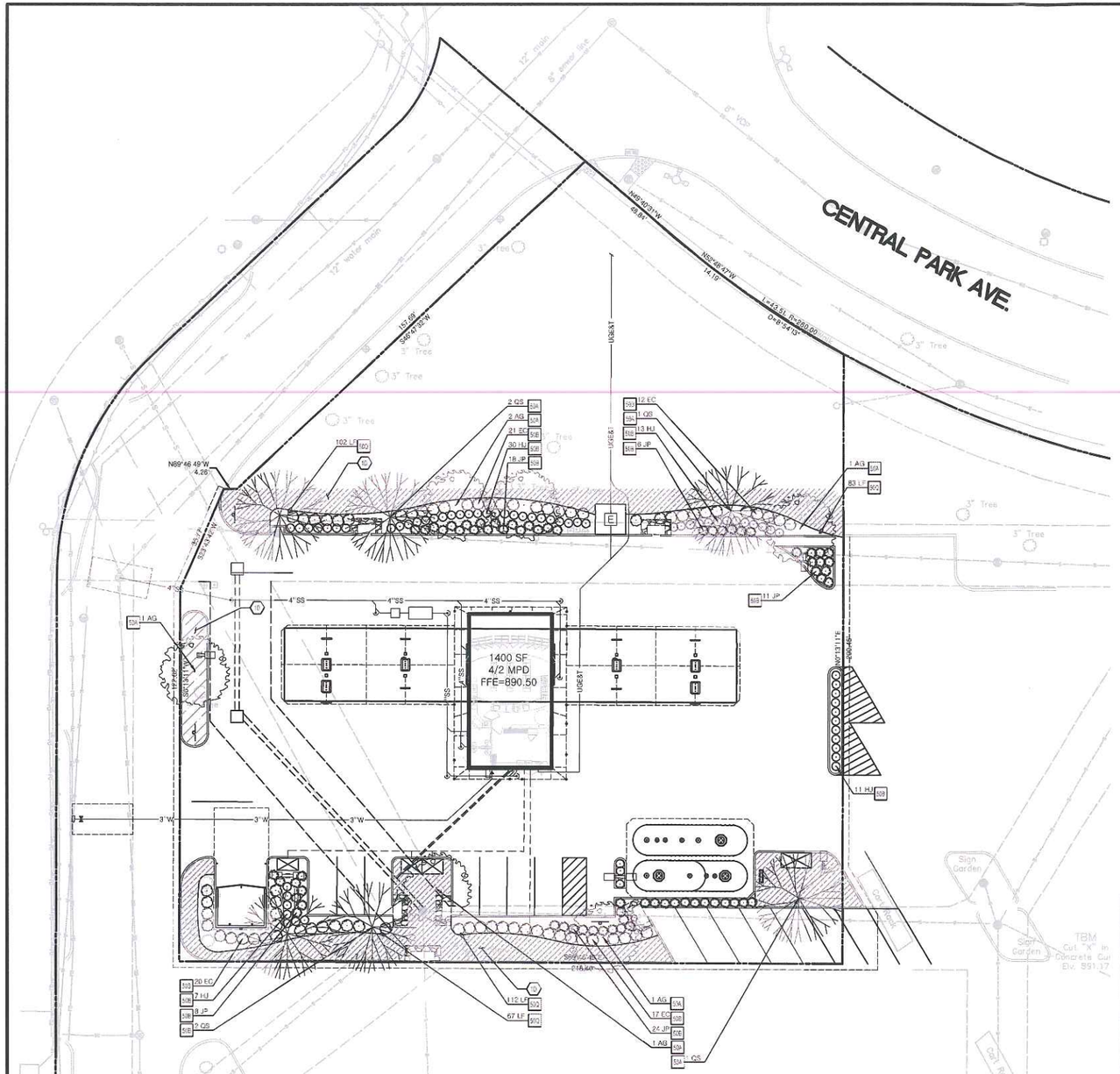
MURPHY OIL U.S.A. INC.
422 N WASHINGTON AVE.
P.O. BOX 7000
EL DORADO, AR 71730-7000

MURPHY USA

JOB # 28055 DRAWING: 28055-GP.dwg LAST SAVED BY: ERNIE

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CENTRAL PARK AVE.
NOTE:
THE CONTRACTOR IS TO RETURN ANY DISTURBED AREA WITHIN THE DRAINAGE POND TO PRE-CONSTRUCTION CONDITIONS.
GC TO USE CONES AND SIGNS TO ROUTE TRAFFIC AROUND THIS AREA DURING CONSTRUCTION
JACK AND BORE UNDER PAVEMENT. OPEN CUT TRENCH NOT PERMITTED BY WAL-MART. GC SHALL UTILIZE DIRECTIONAL BORING OR JACK AND BORE METHODS TO INSTALL ALL UTILITIES THROUGH THE WAL-MART PARKING LOT, ANY PAVED AREAS OR DRIVE AISLES.
UGT
PRIMARY SERVICE TO THESE UTILITIES SHOULD BE BORED TO THIS LOCATION THROUGH ANY PAVED AREAS.
1400 SF
4/2 MPD
FFE=890.50
8 L.F. 4" PVC @ 1.65%
16 L.F. 4" PVC @ 1.91%
59 L.F. 4" PVC @ 2.36%
51 L.F. 4" PVC @ 3.97%
28 LF, 4" PVC @ 3.28%
25 L.F. 4" PVC @ 4.00%
PROPOSED UTILITY EASEMENT
Sewer Manhoole Top 889.48 Inverts 871.6 SW 871.6 SE 860.12 SW
Storm Manhole Top 889.10
Drain Top 888.19 FL 880.69
Electric Box 5.50' AG
water valve vault rim 889.59 main 12" top pipe 883.29
Drain Top 880.02 FL 881.57
Storm Manhole Top 889.84 Inverts 881.85 24" RCP NW-SE 881.65 24" RCP to 889' Pipe
Storm Manhole Top 890.74 Invert 873.00 42" RCP going running E-W (east one west from manhole)
Drain 24" D Concrete Pipe FL 881.70
Sign Garden
Cut "X" in Concrete Curb Elv. 891.17
Rim 891.24 Inverts 881.52 8" VCP N-S 881.52 8" VCP W
Rim 891.63 Inverts 885.33 12" N-S
Rim 890.07 top 12" pipe run c/w top pipe 882.71
Rim 891.08 Inv SE 885.31 18" running southeast from manhole Inv W 885.26 pipe not shown on this map running west from manhole
Sewer Manhole Top 891.50
Rim 891.32 water main Top pipe 882.02
Rim 888.03 Inverts 883.83 8" SW 882.37 42" RCP SE (42" to running 880.58 sump (Note: A structure) 880.58 sump bottom of structure
Rim 891.37 Inverts 881.87 42" RCP NW outlet 881.87 42" RCP south inlet 884.62 8" RCP SE inlet 879.22 sump bottom of structure 42" to west 881.96 invert in
Electric Box 5.00' AG
Water Valve
Water Manhole
Sewer Manhole Top 886.61 Inverts 881.81
Water Valve
Water Manhole
Water Valve
Water Manhole
Water Valve
Water Manhole

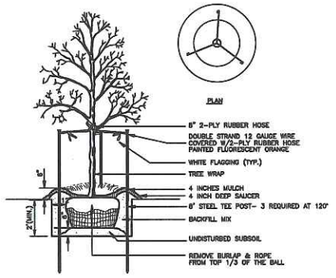


SITE BENCHMARK

THE TBM IS LOCATED IN THE SOUTHEAST CORNER OF THE MAPPING MARKED TBM CUT CROSS IN CURB ELEV 891.17 THIS IS A NAVD 88 DATA

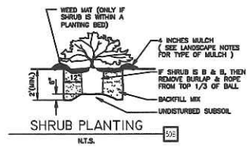
811 Know what's below. Call before you dig.

0 20' 30' 40'
SCALE IN FEET

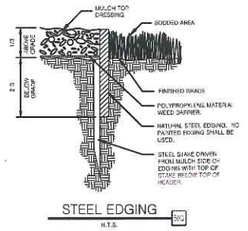


NOTE: SEE LANDSCAPE NOTES FOR THE TYPE OF MULCH MATERIAL TO USE.

TREE PLANTING 50A
N.T.S.



SHRUB PLANTING 50B
N.T.S.



STEEL EDGING 50Q
N.T.S.

EXISTING

- REBAR WITH CAP ENGRAVED JAMES TIDDETT LS 8332
- MAG NAIL SET OR PREVIOUSLY SET
- NAIL FOUND
- RAIL ROAD SPIKE SET OR PREVIOUSLY SET
- RAIL ROAD SPIKE FOUND
- REBAR FOUND
- CHISELED CROSS FOUND OR SET
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- LIGHT POLE (WITH BULBS SHOWN IN NUMBER & ORIENTATION)
- MEASURED
- RECORDED
- POWER POLE
- SIGN - "WORDING"
- STORM DRAINS
- TREE
- FIRE HYDRANT
- MANHOLE
- SPRINKLER
- IRRIGATION CONTROL BOX
- BORE HOLE
- WATER VALVE
- STOP SIGN
- 893.35 / 892.74 BASE OF CURB ELEV. / TOP OF CURB ELEV.
- 1215.59 SPOT ELEVATION

NOT ALL SYMBOLS OR LAYERS ARE NECESSARILY IN THE DRAWING

LINE TYPES

- UNDERGROUND ELECTRIC LINE
- WATER LINE
- GAS LINE
- STORM LINE
- SANITARY SEWER LINE
- FIBER OPTICS LINE OR CONDUIT
- PROPERTY LINE
- ADJACENT PROPERTY LINE
- EASEMENT LINE
- SETBACK LINE
- CONTOUR LINE (1 FOOT)
- INDEX CONTOUR LINE (10 FOOT)

PROPOSED

- BOUNDARY LINE
- TYPICAL PLANTING WITH QUANTITY AND KEY (SEE PLANT LIST)
- CF CONSTRUCTION FENCE

GENERAL LANDSCAPE NOTES

A. LOCATE ALL UTILITIES AND SITE LIGHTING CONDUITS BEFORE LANDSCAPE CONSTRUCTION BEGINS.

B. NOTIFY LANDSCAPE ARCHITECT OR DESIGNATED REPRESENTATIVE OF ANY LAYOUT DISCREPANCIES PRIOR TO ANY PLANTING.

C. ALL LANDSCAPE MATERIALS SHALL BE IN COMPLIANCE WITH THE AMERICAN STANDARD FOR NURSERY STOCK. (ANSI-Z60.1-1998)

D. ALL WAL-MART PROPERTY DAMAGED DUE TO CONSTRUCTION ACTIVITIES MUST BE REPLACED/RESTORED TO MATCH THE EXISTING TYPE AND QUALITY OF WORK AND MATERIALS, AND IS SUBJECT TO WAL-MART APPROVAL.

E. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED SMOOTH AND FOUR INCHES OF TOPSOIL APPLIED. IF ADEQUATE TOPSOIL IS NOT AVAILABLE ON SITE, THE CONTRACTOR SHALL PROVIDE TOPSOIL APPROVED BY THE OWNER, AS NEEDED. THE AREA SHALL THEN BE SODDED, FERTILIZED, MULCHED, WATERED AND MAINTAINED UNTIL HARDY GRASS GROWTH IS ESTABLISHED IN ALL AREAS. ANY RELOCATED TREES SHALL BE MAINTAINED UNTIL SUCH POINT AS TREE IS RE-ESTABLISHED. ANY AREAS DISTURBED SHALL ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE PROJECT SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

F. THE MURPHY STATION WILL NOT DROP WAL-MART'S GREEN SPACE BELOW CITY'S REQUIREMENTS.

G. CONTRACTOR IS TO VERIFY LOCATION OF WAL-MART IRRIGATION SYSTEM, VALVE BOXES, CONTROL BOXES, BACKFLOW PREVENTION DEVICES AND OTHER ITEMS WHICH ARE PART OF THE SYSTEM. IF DAMAGED THEY MUST BE REPAIRED AT CONTRACTOR'S COST.

H. CONTRACTOR IS TO PROTECT EXISTING LANDSCAPING/IRRIGATION MATERIALS.

I. ACCEPTANCE OF GRADING AND SEEDING SHALL BE BY LANDSCAPE ARCHITECT AND/OR OWNER. THE CONTRACTOR SHALL ASSUME MAINTENANCE RESPONSIBILITIES FOR A MINIMUM OF ONE (1) YEAR OR UNTIL SECOND CUTTING, WHICHEVER IS LONGER. MAINTENANCE SHALL INCLUDE WATERING, WEEDING, RESEEDING, AND OTHER OPERATIONS NECESSARY TO KEEP ALL LAWN AREAS IN A THRIVING CONDITIONS. UPON FINAL ACCEPTANCE, OWNER SHALL ASSUME ALL MAINTENANCE RESPONSIBILITIES. AFTER LAWN AREA HAVE GERMINATED, AREAS WHICH FAIL TO SHOW A UNIFORM STAND OF GRASS FOR ANY REASON WHATSOEVER SHALL BE RE-SEEDED REPEATEDLY UNTIL ALL AREAS ARE COVERED WITH A SATISFACTORY STAND OF GRASS. MINIMUM ACCEPTANCE OF SEEDED LAWN AREAS MAY INCLUDE SCATTERED BARE SPOTS, NONE OF WHICH ARE LARGER THAN 1 SQUARE FOOT, AND WHEN COMBINED DO NOT EXCEED 2% OF TOTAL SEEDED LAWN AREA.

J. ALL PERMANENT TURF MUST BE SOD

LANDSCAPE CALCULATIONS		
	REQUIRED	PROVIDED
STREETSCAPE LANDSCAPING		
N/A	N/A	N/A
INTERIOR LANDSCAPING		
N/A	N/A	N/A
PERIMETER LANDSCAPING		
1 TREE AND 5 SHRUBS PER 40 LF OF PARKING LOT	10 TREES 50 SHRUBS	12 TREES 202 SHRUBS

PLANT LIST

KEY	QTY	COMMON NAME/ BOTANICAL NAME	SIZE	REMARKS
QS	6	SHUMARD OAK Quercus shumardii	2.5" CAL.	12' HEIGHT, 6' CLEAR
AG	6	AMUR MAPLE Acer ginnala	2.5" CAL.	12' HEIGHT, 6' O.C.
EC	71	DWARF BURNING BUSH Euonymus alatus 'Compactus'	5 GAL.	36" HEIGHT, 4' O.C.
HJ	64	HOOGENDORN JAPANESE HOLLY Ilex crenata 'Hoogendorn'	3 GAL.	24" HEIGHT, 3' O.C.
JP	87	GREEN MOUND JUNIPER Juniperus procumbens 'Green Mound'	3 GAL.	6" HEIGHT, 3' O.C.

LANDSCAPE NOTES

1D SODDED AREA (KENTUCKY BLUE GRASS)

LANDSCAPE DETAILS

50A TREE PLANTING (TYP.)
50B SHRUB PLANTING (TYP.)
50Q STEEL EDGING

SHEET NO. C-9

REV-0	DATE	DWY PRN	PM PM	DES MMP	DRW MMP
	12/17/14				

LANDSCAPE
WAL-MART SUPERCENTER # 1413
1205 ILLINOIS ROUTE 31
CRYSTAL LAKE ILLINOIS

GEI Engineering Associates, Inc.
ENGINEERS, ARCHITECTS & ENVIRONMENTAL SCIENTISTS
3030 LBJ Freeway, Suite 160
Dallas, TX 75234
(972)488-3737
FAX (972)488-6732
DWG NAME: 28055-LS
JOB NO.: 28055

MURPHY OIL U.S.A. INC.
422 N WASHINGTON AVE.
P.O. BOX 7000
EL DORADO, AR 71730-7000

© 2014 GEI ENGINEERING ASSOCIATES, INC.

JOB # 28055 DRAWING: 28055-LS.dwg LAST SAVED BY: ERNIE



Front Elevation (North)



Right Elevation (West)

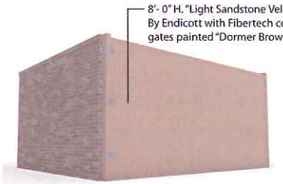


Rear Elevation (South)

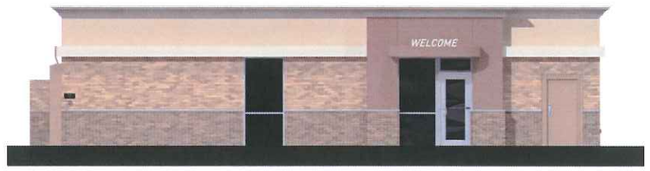


Left Elevation (East)





Trash Enclosure



Left Elevation Detail

Sign	Qty.	Height	Width	Area	Total S.F.
Murphy USA logo sign (canopy)	2	Graphic Area		33.54	67.08
Small Canopy Price Sign	2	43.13"	97.00"	29.05	58.10
Island Spanner	2	25.19"	97.19"	17.00	34.00
Welcome	2	14.25"	89.13"	8.82	17.64
				Total Signage	176.82

RECEIVED
APR 24 2015
BY: 2014-60

B | R | R

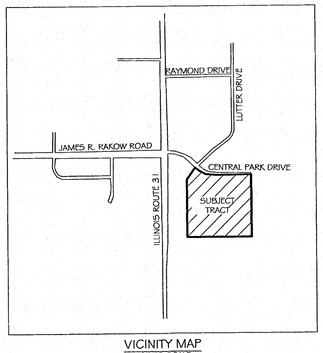
MURPHY USA

Crystal Lake, IL
November 7, 2014

DESIGN REPRESENTATION ONLY - NOT FOR CONSTRUCTION The building images shown are a representation of the current design intent only. The building images may not reflect variations in color, tone, hue, tint, shading, ambient light intensity, materials, texture, contrast, font style, construction variations required by building codes or inspectors, material availability or final design detailing.

PRELIMINARY PLAT
WAL-MART COMMERCIAL SUBDIVISION

A TRACT BEING LOT 1 OF THE FINAL PLAT OF RESUBDIVISION OF LOT 1 OF THE FINAL PLAT OF LUTTER SUBDIVISION - UNIT 1, BEING A SUBDIVISION OF PART OF THE NORTHEAST QUARTER OF SECTION 15, TOWNSHIP 43 NORTH, RANGE 8 EAST OF THE THIRD PRINCIPAL MERIDIAN, CITY OF CRYSTAL LAKE, McHENRY COUNTY, ILLINOIS



VICINITY MAP
NOT TO SCALE

SURVEYORS NOTES:
1) BASIS OF BEARINGS IS BASED UPON THE ILLINOIS STATE PLANE COORDINATE SYSTEM OF 1983, EAST ZONE.

2) PARENT TRACT RECORDED IN DOCUMENT #2005R0097159

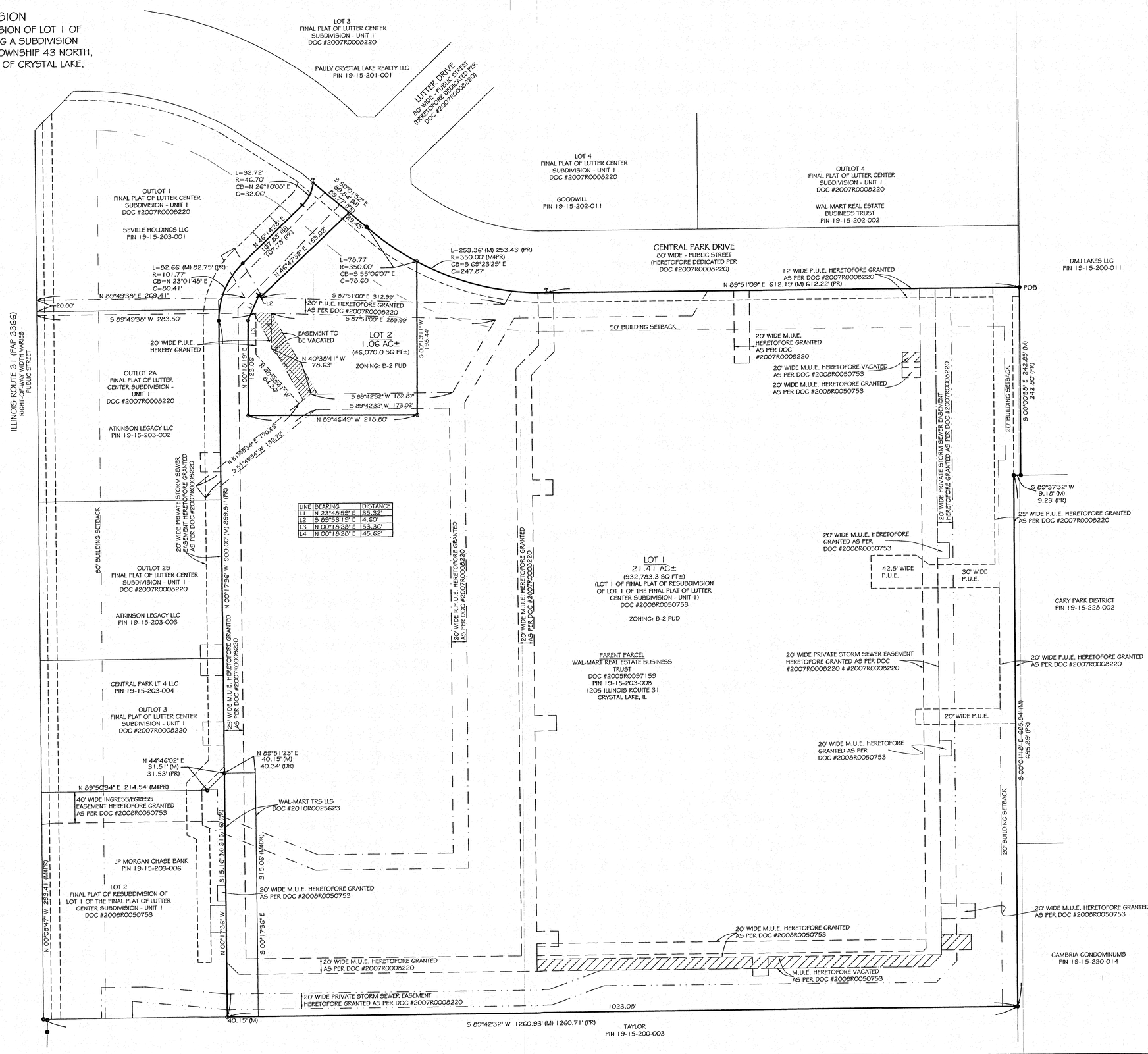
3) BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS LOCATED IN ZONE "X" OR AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN AS IDENTIFIED FOR THE COUNTY OF McHENRY, ILLINOIS BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY ON FLOOD INSURANCE RATE MAP NUMBER 17111C0335J, DATED NOVEMBER 16, 2006 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE.

4) EASEMENT GRANTED PER FINAL PLAT LUTTER CENTER SUBDIVISION - UNIT 1 WAS REGRANTED VIA FINAL PLAT OF RESUBDIVISION OF LOT 1 OF THE FINAL PLAT OF LUTTER CENTER SUBDIVISION - UNIT 1.

5) THIS SUBDIVISION PLAT IS BASED UPON THE FINAL PLAT OF LUTTER CENTER SUBDIVISION - UNIT 1 RECORDED AS DOCUMENT #2007R0008220 AND THE FINAL PLAT OF RESUBDIVISION OF LOT 1 OF THE FINAL PLAT OF LUTTER CENTER SUBDIVISION - UNIT 1 RECORDED AS DOCUMENT #2008R0050753.

6) SEE FINAL PLAT OF LUTTER CENTER SUBDIVISION - UNIT 1 AND THE FINAL PLAT OF RESUBDIVISION OF LOT 1 OF THE FINAL PLAT OF LUTTER CENTER SUBDIVISION - UNIT 1 FOR EASEMENT DIMENSIONS.

7) SEE FINAL PLAT OF LUTTER CENTER SUBDIVISION - UNIT 1 AND THE FINAL PLAT OF RESUBDIVISION OF LOT 1 OF THE FINAL PLAT OF LUTTER CENTER SUBDIVISION - UNIT 1 FOR EASEMENT PROVISIONS.



LINE	BEARING	DISTANCE
L1	N 23°48'59" E	35.32'
L2	S 89°53'19" E	4.60'
L3	N 00°18'28" E	53.36'
L4	N 00°18'28" E	45.62'

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 inch = 60 ft.

Legend
- ○ #5x30" REBAR SET
- ● IRON PIN/PIPE FOUND
- ⚲ PK NAIL
- × CHISELED "X"
- ⊗ COTTON GIN SPINDLE
- POB POINT OF BEGINNING
- (M) DISTANCE MEASURED THIS SURVEY
- (PR) DISTANCE PER PLAT RECORD
- (DR) DISTANCE PER DEED RECORD
- P.U.E. PUBLIC UTILITY EASEMENT
- M.U.E. MUNICIPAL UTILITY EASEMENT
- M.E. MUNICIPAL EASEMENT
- R.P.U.E. RESTRICTED PUBLIC UTILITY EASEMENT

RECEIVED
APR 28 2015
BY: 2014-60

PRELIMINARY PLAT
WAL-MART COMMERCIAL SUBDIVISION

NO.	DATE	REVISION DESCRIPTION	BY

FOUR POINTS LAND SURVEYING, INC.
4905 OLD ROUTE 66, SUITE 103
FAUMPA, MO. 63340
573-406-3533
FOURPOINTSLAND.COM
ILLINOIS PROFESSIONAL DESIGN FIRM #184.006244

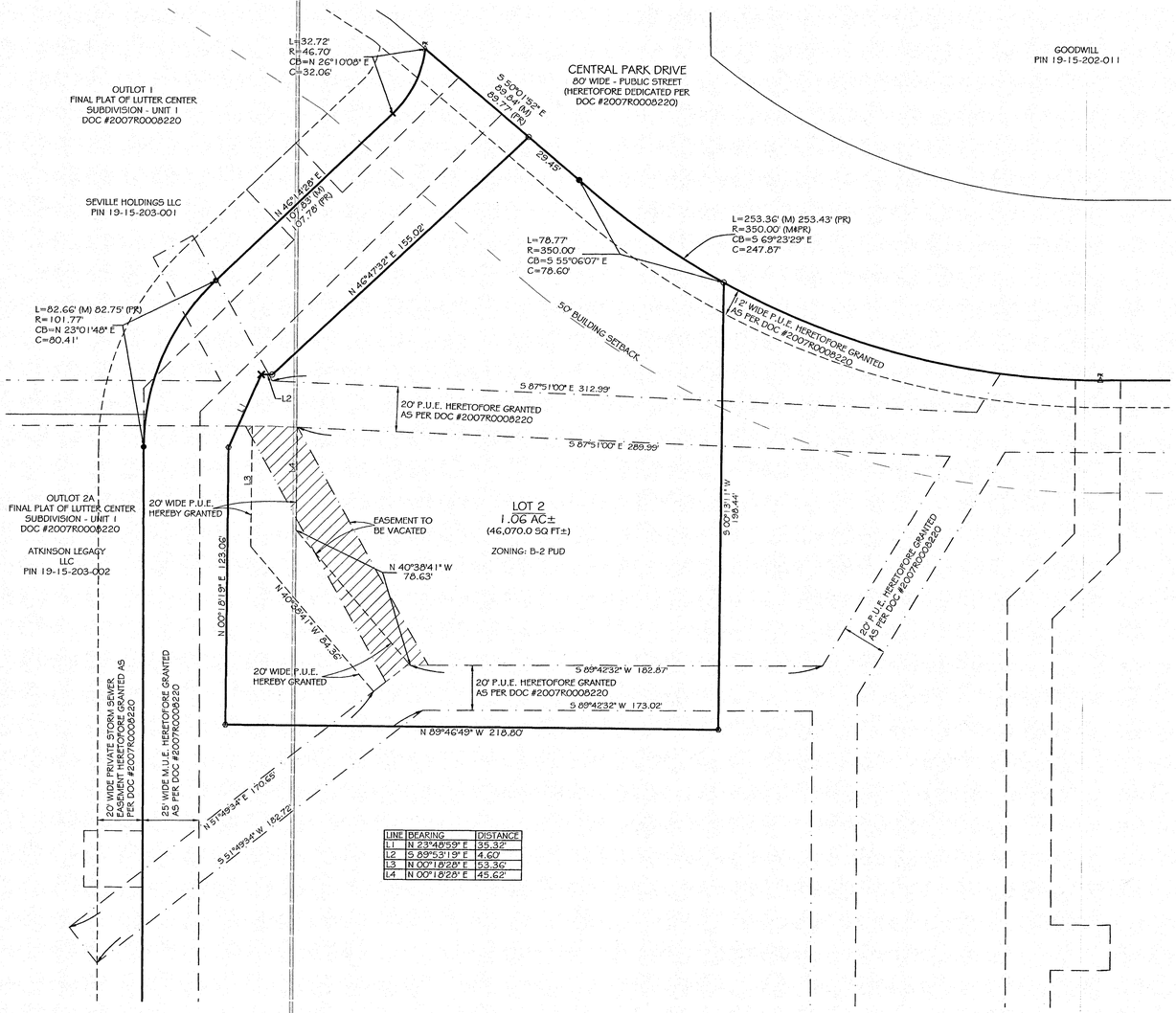
SUBDIVISION
PREPARED FOR:
WAL-MART REAL ESTATE BUSINESS TRUST

DRAWN	CHECKED
NDE	NDE

FIELD - NDE
FD BK - IL#4
PG - 1
DRAWING NAME
140110
PROJECT NO.
14-0110
SHEET NO.
1 OF 2

PRELIMINARY PLAT
WAL-MART COMMERCIAL SUBDIVISION

A TRACT BEING LOT 1 OF THE FINAL PLAT OF RESUBDIVISION OF LOT 1 OF THE FINAL PLAT OF LUTTER SUBDIVISION - UNIT 1, BEING A SUBDIVISION OF PART OF THE NORTHEAST QUARTER OF SECTION 15, TOWNSHIP 43 NORTH, RANGE 8 EAST OF THE THIRD PRINCIPAL MERIDIAN, CITY OF CRYSTAL LAKE, McHENRY COUNTY, ILLINOIS



LINE	BEARING	DISTANCE
L1	N 23°48'59" E	35.32'
L2	S 89°53'19" E	4.60'
L3	N 00°18'28" E	53.36'
L4	N 00°18'28" E	45.62'

N

GRAPHIC SCALE
15 0 15 30
(IN FEET)
1 inch =30 ft.

Legend
- ○ #5x30" REBAR SET
- ● IRON PIN/PIPE FOUND
- △ PK NAIL
- × CHISELED "X"
- ⊗ COTTON GIN SPINDLE
- POB POINT OF BEGINNING
- (M) DISTANCE MEASURED THIS SURVEY
- (PR) DISTANCE PER PLAT RECORD
- (DR) DISTANCE PER DEED RECORD
- P.U.E. PUBLIC UTILITY EASEMENT
- M.U.E. MUNICIPAL UTILITY EASEMENT
- M.E. MUNICIPAL EASEMENT
- R.P.U.E. RESTRICTED PUBLIC UTILITY EASEMENT

SURVEYORS NOTES:
1) BASIS OF BEARINGS IS BASED UPON THE ILLINOIS STATE PLANE COORDINATE SYSTEM OF 1983, EAST ZONE.

2) PARENT TRACT RECORDED IN DOCUMENT #2005R0097159

3) BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS LOCATED IN ZONE "X" OR AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN AS IDENTIFIED FOR THE COUNTY OF McHENRY, ILLINOIS BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY ON FLOOD INSURANCE RATE MAP NUMBER 17111C0335J, DATED NOVEMBER 16, 2006 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE.

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7) SEE FINAL PLAT OF LUTTER CENTER SUBDIVISION - UNIT 1 AND THE FINAL PLAT OF RESUBDIVISION OF LOT 1 OF THE FINAL PLAT OF LUTTER CENTER SUBDIVISION - UNIT 1 FOR EASEMENT PROVISIONS.

SURVEYOR'S CERTIFICATE

STATE OF MISSOURI)
) SS
COUNTY OF MARION)

THIS IS TO CERTIFY THAT I, NORMAN D. ELLERBROCK, HAVE SURVEYED AND SUBDIVIDED THE PROPERTY AS DESCRIBED AND SHOWN BY THE PLAT, WHICH IS A CORRECT REPRESENTATION OF SAID SURVEY AND SUBDIVISION. ALL DISTANCES ARE SHOWN IN FEET AND DECIMALS THEREOF. DIMENSIONS SHOWN ALONG CURVES ARE ARC DISTANCES UNLESS OTHERWISE NOTED.

A TRACT OF LAND BEING LOT 1 OF THE FINAL PLAT OF RESUBDIVISION OF LOT 1 OF THE FINAL PLAT OF LUTTER CENTER SUBDIVISION – UNIT 1 RECORDED AS DOCUMENT #2008R0050753 AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS;

BEGINNING AT A FOUND IRON PIN AT THE NORTHEAST CORNER OF SAID LOT 1; THENCE SOUTH 00 DEGREES 00 MINUTES 58 SECONDS EAST ALONG THE EAST LINE OF SAID LOT 1 A DISTANCE OF 242.55 FEET TO A FOUND IRON PIN; THENCE CONTINUING ALONG SAID EAST LINE SOUTH 89 DEGREES 37 MINUTES 32 SECONDS WEST A DISTANCE OF 9.18 FEET TO A FOUND IRON PIN; THENCE SOUTH 00 DEGREES 01 MINUTES 18 SECONDS EAST A DISTANCE OF 695.84 FEET TO A FOUND IRON PIN AT THE SOUTHEAST CORNER OF SAID LOT 1; THENCE SOUTH 89 DEGREES 42 MINUTES 32 SECONDS WEST ALONG THE SOUTH LINE OF SAID LOT 1 A DISTANCE OF 1023.08 FEET TO A #5 REBAR SET AT THE SOUTHWEST CORNER OF SAID LOT 1; THENCE NORTH 00 DEGREES 17 MINUTES 36 SECONDS WEST ALONG THE WEST LINE OF SAID LOT 1 A DISTANCE OF 900.00 FEET TO A FOUND IRON PIN; THENCE CONTINUING ALONG SAID WEST LINE ALONG A CURVE TO THE RIGHT WITH AN ARC LENGTH OF 82.66 FEET, A RADIUS OF 101.77 FEET, A CHORD BEARING OF NORTH 23 DEGREES 01 MINUTES 48 SECONDS EAST, AND A CHORD LENGTH OF 80.41 FEET TO A FOUND IRON PIN; THENCE CONTINUING ALONG SAID WEST LINE NORTH 46 DEGREES 14 MINUTES 28 SECONDS EAST A DISTANCE OF 107.83 FEET TO A FOUND CHISELED "X"; THENCE CONTINUING ALONG SAID WEST LINE ALONG A CURVE TO THE LEFT WITH AN ARC LENGTH OF 32.72 FEET, A RADIUS OF 46.70 FEET, A CHORD BEARING OF NORTH 26 DEGREES 10 MINUTES 08 SECONDS EAST, AND A CHORD LENGTH OF32.06 FEET TO A FOUND PK NAIL AT THE NORTHWEST CORNER OF SAID LOT 1; THENCE SOUTH 50 DEGREES 01 MINUTES 52 SECONDS EAST ALONG THE NORTH LINE OF SAID LOT 1 A DISTANCE OF 89.84 FEET TO A FOUND IRON PIN; THENCE CONTINUING ALONG SAID NORTH LINE WITH A CURVE TO THE LEFT WITH AN ARC LENGTH OF 253.36 FEET, A RADIUS OF 350.00 FEET, A CHORD BEARING OF SOUTH 69 DEGREES 23 MINUTES 29 SECONDS EAST, AND A CHORD LENGTH OF 247.87 FEET, THENCE CONTINUING ALONG SAID NORTH LINE NORTH 89 DEGREES 51 MINUTES 09 SECONDS EAST A DISTANCE OF 612.19 FEET TO THE POINT OF BEGINNING, CONTAINING 22.47 ACRES MORE OR LESS (978,853.3 SQUARE FEET MORE OR LESS).

I FURTHER CERTIFY THAT THIS PROFESSIONAL SERVICE CONFORMS TO THE CURRENT ILLINOIS MINIMUM STANDARDS FOR A BOUNDARY SURVEY, AND THAT MONUMENTS FOUND AT ALL SUBDIVISION CORNERS HAVE BEEN IDENTIFIED AND THAT 5/8" IRON BARS OR OTHER FORMS OF MONUMENTATION ARE SET AT ALL LOT CORNERS AND POINT OF CHANGE IN ALIGNMENT AS REQUIRED BY THE PLAT ACT ILLINOIS REVISED STATUTES 2005, 765ILCS 205/1).

I FURTHER CERTIFY THAT THE ABOVE DESCRIBED PROPERTY IS LOCATED IN ZONE "X" OR AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN AS IDENTIFIED FOR THE COUNTY OF MCHENRY, ILLINOIS BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY ON FLOOD INSURANCE RATE MAP NUMBER 17111C0335J, DATED NOVEMBER 16, 2006.

I FURTHER CERTIFY THAT THIS SUBDIVISION LIES WITHIN THE CORPORATE LIMITS OF CRYSTAL LAKE, ILLINOIS.

GIVEN UNDER MY HAND AND SEAL THIS _____ DAY OF _____, A.D. 20___.

_____
NORMAN D. ELLERBROCK
ILLINOIS PROFESSIONAL LAND SURVEYOR #35-3159
LICENSE EXPIRES 11/30/2016
ILLINOIS PROFESSIONAL DESIGN FIRM #184-006044

OWNER'S CERTIFICATE

STATE OF _____)
) SS
COUNTY OF _____)

THIS IS TO CERTIFY THAT THE UNDERSIGNED, _____ ARE THE LEGAL OWNERS OF A PORTION OF THE LAND DESCRIBED ON THE PLAT HEREON DRAWN AND SHOWN HEREON AS SUBDIVIDED; THAT THEY HAVE CAUSED SAID LAND TO BE SURVEYED, SUBDIVIDED, STAKED AND PLATTED AS SHOWN HEREON, FOR THE PURPOSE OF HAVING THIS PLAT RECORDED PROVIDED BY LAW, AND AS THE OWNERS, DO HEREBY STATE THAT TO THE BEST OF OUR KNOWLEDGE, ALL OF THE LOTS IN THIS SUBDIVISION LIE WITHIN:

CRYSTAL LAKE COMMUNITY CONSOLIDATED SCHOOL DISTRICT 47
CRYSTAL LAKE HIGH SCHOOL DISTRICT 155

SEAL(S) THIS _____ DAY OF _____, A.D. 20____

_____

_____

NOTARY CERTIFICATE

STATE OF _____)
) SS
COUNTY OF _____)

I, THE UNDERSIGNED, A NOTARY PUBLIC IN AND FOR THE COUNTY AND STATE AFORESAID, DO HEREBY CERTIFY THAT _____ OF _____ PERSONALLY KNOWN TO ME TO BE THE SAME PERSON OR PERSONS WHOSE NAME OR NAMES ARE SUBSCRIBED TO THE FOREGOING INSTRUMENT AS, _____ RESPECTIVELY APPEARED BEFORE ME THIS DAY IN PERSON AND ACKNOWLEDGED THAT THEY SIGNED AND DELIVERED THE SAID INSTRUMENT AS THEIR OWN FREE AND VOLUNTARY ACT FOR THE USES AND PURPOSES SET FORTH.

GIVEN UNDER MY HAND AND NOTARIAL SEAL, THIS _____ DAY OF _____, A.D. 20___.

_____
NOTARY PUBLIC

SURFACE WATER DRAINAGE CERTIFICATE

STATE OF _____)
) SS
COUNTY OF _____)

I, _____, OWNER(S) AND I, _____, PROFESSIONAL ENGINEER OF THE STATE OF ILLINOIS, DO HEREBY CERTIFY THAT TO THE BEST OF OUR KNOWLEDGE AND BELIEF THAT THE DRAINAGE OF SURFACE WATERS WILL NOT BE CHANGED BY THE CONSTRUCTION OF THIS SUBDIVISION OR ANY PART THEREOF, OR IF SUCH CHANGES OCCUR, ADEQUATE PROVISIONS HAVE BEEN MADE FOR THE COLLECTION AND DIVERSION OF SUCH SURFACE WATERS INTO PUBLIC AREAS OR DRAINS WHICH THE SUBDIVIDER HAS A RIGHT TO USE, AND THAT SUCH SURFACE WATERS WILL NOT BE DEPOSITED ON ADJOINING LAND OWNERS IN SUCH CONCENTRATION AS MAY CAUSE DAMAGE TO THE ADJOINING PROPERTY BECAUSE OF THE CONSTRUCTION OF THIS SUBDIVISION.

_____
OWNER(S)

_____
REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS

COUNTY CLERK'S CERTIFICATE

STATE OF ILLINOIS)
) SS
COUNTY OF McHENRY)

I, _____, COUNTY CLERK IN McHENRY COUNTY, ILLINOIS DO HEREBY CERTIFY THAT THERE ARE NO DELINQUENT GENERAL TAXES, NO UNPAID CURRENT GENERAL TAXES, NO UNPAID FORFEITED TAXES, AND NO REDEEMABLE TAX AGAINST ANY OF THE LAND INCLUDED IN THE ATTACHED PLAT. I FURTHER CERTIFY THAT I HAVE RECEIVED ALL STATUTORY FEES IN CONNECTION WITH THIS PLAT.

GIVEN UNDER MY HAND AND SEAL OF THE COUNTY OF McHENRY, ILLINOIS, THIS _____ DAY OF _____, A.D. 20____.

_____
McHENRY COUNTY CLERK

PLANNING AND ZONING COMMISSION CERTIFICATE

STATE OF ILLINOIS)
) SS
COUNTY OF McHENRY)

I, _____, CHAIRMAN OF THE CRYSTAL LAKE PLANNING AND ZONING COMMISSION, DO HEREBY CERTIFY THAT ON THIS _____ DAY OF _____, A.D. 20____. THIS PLAT OF SUBDIVISION WAS DULY APPROVED BY THE PLANNING AND ZONING COMMISSION OF THE CITY OF CRYSTAL LAKE.

_____
CHAIRMAN

CITY COUNCIL CERTIFICATE

STATE OF ILLINOIS)
) SS
COUNTY OF McHENRY)

APPROVED BY THE CITY COUNCIL OF CRYSTAL LAKE, ILLINOIS THIS _____ DAY OF _____, A.D. 20____.

_____
MAYOR

_____
ATTEST: CITY CLERK

RECORDER'S CERTIFICATE

STATE OF ILLINOIS)
) SS
COUNTY OF McHENRY)

THIS INSTRUMENT FILED FOR RECORD IN THE RECORDER'S OFFICE OF McHENRY COUNTY, ILLINOIS ON THIS _____ DAY OF _____, A.D. 20____, AT _____ O'CLOCK __M. AND RECORDED AS DOCUMENT NUMBER _____

_____
McHENRY COUNTY RECORDER

ILLINOIS DEPARTMENT OF TRANSPORTATION CERTIFICATE

THIS PLAT HAS BEEN APPROVED BY THE ILLINOIS DEPARTMENT OF TRANSPORTATION WITH RESPECT TO ROAD WAY ACCESS PURSUANT OF §2 OF "AN ACT TO REVISED THE LAW IN RELATION TO PLATS," AS AMENDED. A PLAN THAT MEETS THE REQUIREMENTS CONTAINED IN THE DEPARTMENTS "POLICY ON PERMITS FOR ACCESS DRIVEWAYS TO STATE HIGHWAYS" WILL BE REQUIRED BY THE DEPARTMENT.

_____
JOHN FORTMANN, P.E., DEPUTY DIRECTOR OF HIGHWAYS
REGION ONE ENGINEER

THIS PLAT PRESENTED FOR RECORDING BY:

_____

_____

_____

_____

PRELIMINARY PLAT
WAL-MART COMMERCIAL SUBDIVISION

NO.	DATE	REVISION DESCRIPTION	BY

FOUR POINTS LAND SURVEYING, INC.
4950 COUNTY ROAD 403
KNOX, IN 46534
574-406-5533
ILLINOIS PROFESSIONAL DESIGN FIRM #184-006044

5/20/2015
PREPARED FOR:
WAL-MART REAL ESTATE BUSINESS TRUST

DRAWN	CHECKED
NDE	NDE

FIELD - NDE
FD BK. - 1144
PG - 1
DRAWING NAME
140110
PROJECT NO.
14-0110
SHEET NO.
2 OF 2

REPORT



Environmental Impact Statement
Murphy USA
Walmart Supercenter #1413 Outlot
1205 South Illinois Route 31
McHenry County
Crystal Lake, Illinois

Project Number:
2014.4653.02



Site Visit:
May 12, 2015
Report Date:
May 13, 2015

We're here for you
UNITED CONSULTING

We're here for you
UNITED CONSULTING

May 13, 2015

Mr. Kofi Addo
CEI Engineering Associates
Tri West Plaza 3030 LBJ Freeway
Suite 100
Dallas, TX 75234

Via Email: kaddo@ceieng.com

RE: Environmental Impact Statement
Murphy USA
Walmart Supercenter #1413 Outlot
1205 S. IL Route 31
Crystal Lake, Illinois
Proposal No.: 2014.4653.02

Dear Mr. Addo:

United Consulting is pleased to submit this Environmental Impact Statement for the above referenced Project Site. We appreciate the opportunity to assist you with this project. Please contact us if you have any questions or if we can be of further assistance.

Sincerely,

UNITED CONSULTING

Leonard J. Diprima, Jr., P.G.
Senior Environmental Specialist

Chris L. Roberds, P.G.
Senior Executive Vice President

BTK/LJD/CLR/tl

SharePoint: 2014.4653.02

TABLE OF CONTENTS

EXECUTIVE SUMMARY
ENVIRONMENTAL IMPACT STATEMENT 4
1.0 INTRODUCTION 4
2.0 DESCRIPTION OF SITE AND SURROUNDING AREA 4
3.0 PHYSICAL SETTING SOURCES 4
4.0 POTENTIAL RECEPTORS 5
5.0 PREVENTION OF A RELEASE 6
6.0 CHARACTERISTICS OF A POTENTIAL PETROLEUM PLUME 6
7.0 REFERENCES 7

FIGURES
Figure 1: Site Location Map
Figure 2: USGS Topographic Map
Figure 3: Well Locations Map
Figure 4: NWI Map
Figure 5: U.S. Army Corps of Engineers ADID Map

APPENDIX A: ISGS Quadrangle Map for Crystal Lake, Illinois

APPENDIX B: ISGS Water Well Records

EXECUTIVE SUMMARY

United Consulting has prepared the Environmental Impact Statement for **Murphy USA** site located at 1205 S. IL Route 31, Crystal Lake, McHenry County, Illinois, hereafter referred to as the Project Site.

The Project Site consists of an approximate 0.77 acre section of a Wal-Mart Supercenter parking lot located at 1205 South Illinois Route 13 in Crystal Lake, Illinois. The Project Site is located in a mixed use area.

Ten wells were located within 2,500 feet of the Project Site. The closest municipal wells are located approximately 9,000 feet west-northwest. The nearest wetland to the Project Site is a farmed wetland located one third of a mile south of the Project Site. A detention pond 500 feet northeast of the Project Site is the nearest surface water body to the Project Site.

A potential release of petroleum product at the Project Site is expected to migrate south-southeast towards the Fox River. The closest potential receptors in the estimated, general downgradient direction of groundwater flow for a potential release of petroleum from the Project Site are:

- Potable water well located approximately 1,110 feet south-southwest of the Project Site at Whispering Hills;
- Farmed Wetland approximately one third of a mile south of the Project Site; and
- The Lake in the Hills Fen is located approximately 7,000 feet west southwest of the Project Site.

The distance to these potential receptors reduces the risk that they would be impacted by a release of petroleum products from the Project Site.

The text of the report should be reviewed for a discussion of these items.

ENVIRONMENTAL IMPACT STATEMENT
1.0 INTRODUCTION

United Consulting was retained by **CEI Engineering Associates** to prepare an Environmental Impact Statement (EIS) for the Project Site. The purpose of the EIS was to determine the hypothetical characteristics of a potential petroleum release from the proposed facility at the Project Site and to identify hypothetical receptors for a potential release.

2.0 DESCRIPTION OF SITE AND SURROUNDING AREA

The Project Site consists of 0.77-acres of asphalt-paved parking area and grass covered land approximately 230 feet west-northwest of the existing Wal-Mart Supercenter #1413. The Project Site is adjoined to the south and to the east by asphalt paved parking area. The Project Site is adjoined to the west by an asphalt paved driveway followed by a commercial structure containing several businesses including: Starbucks Coffee, Subway, Sally Beauty Supply, Ca$h Store, GameStop, and Verizon Wireless. To the northwest, the Project Site is adjoined by BMO Harris Bank. The Project Site is adjoined to the north by grass covered land followed by the intersection of James R. Rakow Road and Lutter Drive, and a Toyota car dealership. Properties in the area surrounding the Project Site were generally commercial and residential. A large commercial or industrial structure was observed northwest of the Project Site. The location of the Project Site is shown in Figure 1.

3.0 PHYSICAL SETTING SOURCES

The Project Site is located in the Central Lowland Physiographic Province of Illinois, which is characterized by low rolling terrain and steep ridges along glacial valleys and rivers. Furthermore, the Project Site is located in the Wheaton Morainal Country of the Great Lake Section of the Central Lowland. The Wheaton Morainal Country is characterized by rolling, hilly topography, broad morainic ridges, and numerous lakes and swamps.

The Illinois State Geological Survey (ISGS) Surficial Geology of Crystal Lake Quadrangle indicates that the Project Site is underlain by the Henry Formation (fine facies) and the Haeger Member, Lemont Formation. Fine facies is described as “sand, fine to medium, uniform to stratified; lenses of fossiliferous silt, loam, gravelly sand, and diamicton at base; yellowish brown to gray; as much as 38 feet thick.” Haeger Member, Lemont Formation is described as diamicton; sandy loam to loam; dolomite-rich; usually oxidized yellowish brown; includes lenses and layers of sand and gravel; in most places, less than 15 feet thick; in some areas, Haeger member diamicton is buried by as much as 20 feet of sand and gravel (Henry Formation). The ISGS Surficial Geology of Crystal Lake Quadrangle is provided in Appendix A.

Based on the USGS topographic map of Crystal Lake, 1992, the Project Site appears to be located on a wide ridge. Groundwater at the Project Site is expected to flow south-southeast toward the Fox River. A copy of the USGS topographic map is found in Figure 2.

4.0 POTENTIAL RECEPTORS

The Illinois State Geological Survey (ISGS) is an official repository for records of wells drilled in the state of Illinois. The Illinois Water and Related Wells Mapping Applications (ILWATER) interactive map was accessed via the ISGS website and mapped ten water wells within 2500 feet of the Project Site. The locations of these wells are shown in Figure 3. The well records for these ten wells are provided in Appendix B.

During our site visit, United Consulting attempted to field-locate the nearest wells to the Project Site. The field location involved a foot and automobile reconnaissance of the Project Site and of the area surrounding the Project Site.

One residential well was field located approximately 390 feet west of the Project Site and has a total depth of 94 feet below grade. Two wells were field located at The Barn Nursery and Landscape Center (The Barn). The Barn was located at 8109 S. Illinois Route 31. These wells were located approximately 760 feet west-northwest and 450 feet west-northwest of the Project Site, respectively. The Barn wells have total depths of 80 feet and 90 feet below grade. According to employees at this facility, the wells at The Barn are used for irrigation purposes and drinking water is provided by municipal utilities. One well was field located approximately 1,110 feet south-southwest of the Project Site at Whispering Hills Garden & Landscape Center (Whispering Hills). The total depth of the Whispering Hills well is unknown. A manager at this facility indicated that this well provides drinking water to Whispering Hills.

In a telephone conversation with Mr. Andrew Resek, Water & Sewer Division Superintendent for the City of Crystal Lake, Mr. Resek indicated that the three closest municipal wells to the Project Site were located approximately 9,000 feet west-northwest of the Project Site. The total depth of only one municipal well was available, and is 1,300 feet below grade.

United Consulting reviewed the National Wetland Inventory (NWI) Wetlands Map and the U.S. Army Corps of Engineers Advanced Identification of Aquatic Resources (ADID) Map. These maps are reproduced in Figures 5 and 6, respectively. Based on this review, the closest wetland is a Farmed Wetland approximately one third of a mile south of the Project Site.

Based on the review of aerial imagery and on the site visit, the nearest surface water body is the Walmart property retention pond located 500 feet to the northeast.

The Lake In The Hills Fen appears to be the nearest fen to the Project Site and is located approximately 7,000 feet west southwest of the Project Site.

5.0 PREVENTION OF A RELEASE

One Xerxes 25,000 gallon, double-walled, single compartment underground storage tank, intended to contain regular gasoline, and one 26,000 gallon, double-walled, split compartment underground storage tank, intended to contain premium gasoline and diesel, are proposed to be installed at the Project Site. United Consulting reviewed the Fuel Development Plans for the Project Site that were provided by **CEI Engineering Associates**. The design elements employed by Murphy USA to prevent the release of petroleum products into the environment include:

- Double-wall, dry interstitial space design for both tanks;
- Interstitial petroleum detection probe for both tanks;
- Observation well installation in the tank pit;
- Overfill protection at each fill port of each tank;
- Secondary containment sump around each product pump on each tank;
- Sump sensor within each secondary containment sump at each product pump for of each tank;
- Double-walled piping with gravity drainage back to each product pump secondary containment sump;
- Secondary containment sump beneath each product dispenser; and a
- Sump sensor within each secondary containment sump at each dispenser.

6.0 CHARACTERISTICS OF A POTENTIAL PETROLEUM PLUME

Based on the topography of the Project Site and surrounding area, a potential plume is expected to migrate south-southeast of the Project Site, in the general direction of the Fox River. The closest potential receptors in the estimated, general downgradient direction of groundwater flow for a potential release of petroleum from the Project Site are:

- Potable water well located approximately 1,110 feet south-southwest of the Project Site at Whispering Hills;
- Farmed Wetland approximately one third of a mile south of the Project Site; and
- The Lake in the Hills Fen is located approximately 7,000 feet west southwest of the Project Site.

The distance to these potential receptors reduces the risk that they would be impacted by a release of petroleum products from the Project Site.

7.0 REFERENCES

Google Earth Aerial Photograph: 2013

ISGS ILWATER Interactive Map

Low-Flow Characteristics of Streams in the Kishwaukee River Basin, Illinois
US Geological Survey, Water-Resources Investigations Report 84-4311, 1985

Physiographic Divisions of Illinois
Illinois State Geological Survey
http://isgs.illinois.edu/content/physiographic-divisions-illinois

USGS Topographic Map Crystal Lake, IL, 1992

US Army Corps of Engineers ADID Map

US Fish and Wildlife Services National Wetland Inventory Map



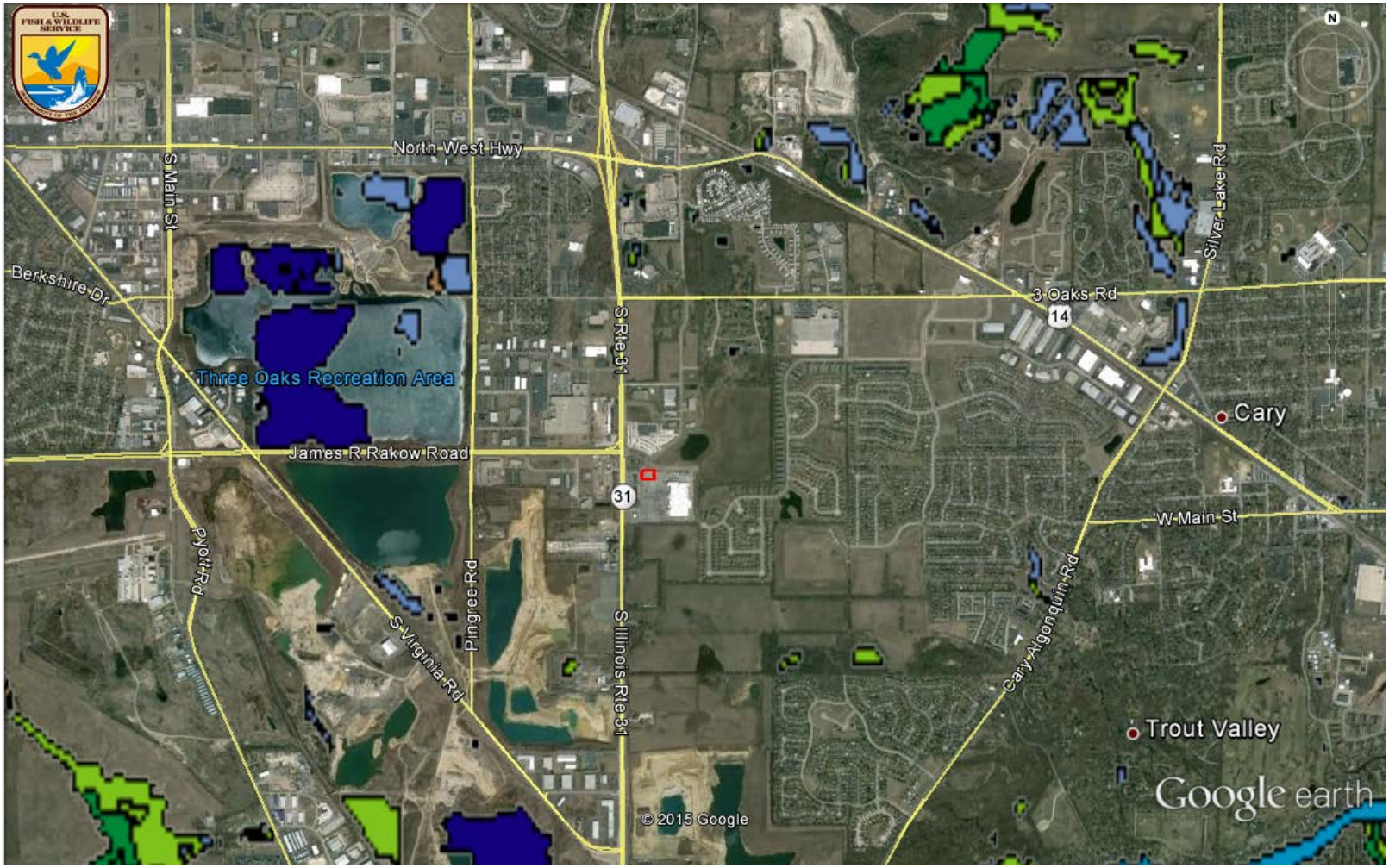
We're here for you UNITED CONSULTING	N	Scale:	As Shown	Notes:	Client:	CEI
		Prepared:	BTK		Site:	Murphy USA Crystal Lake, IL
		Checked:	LJP		Title:	Site Location Map
		Project No.:	2014.4653.02			

FIG. 1



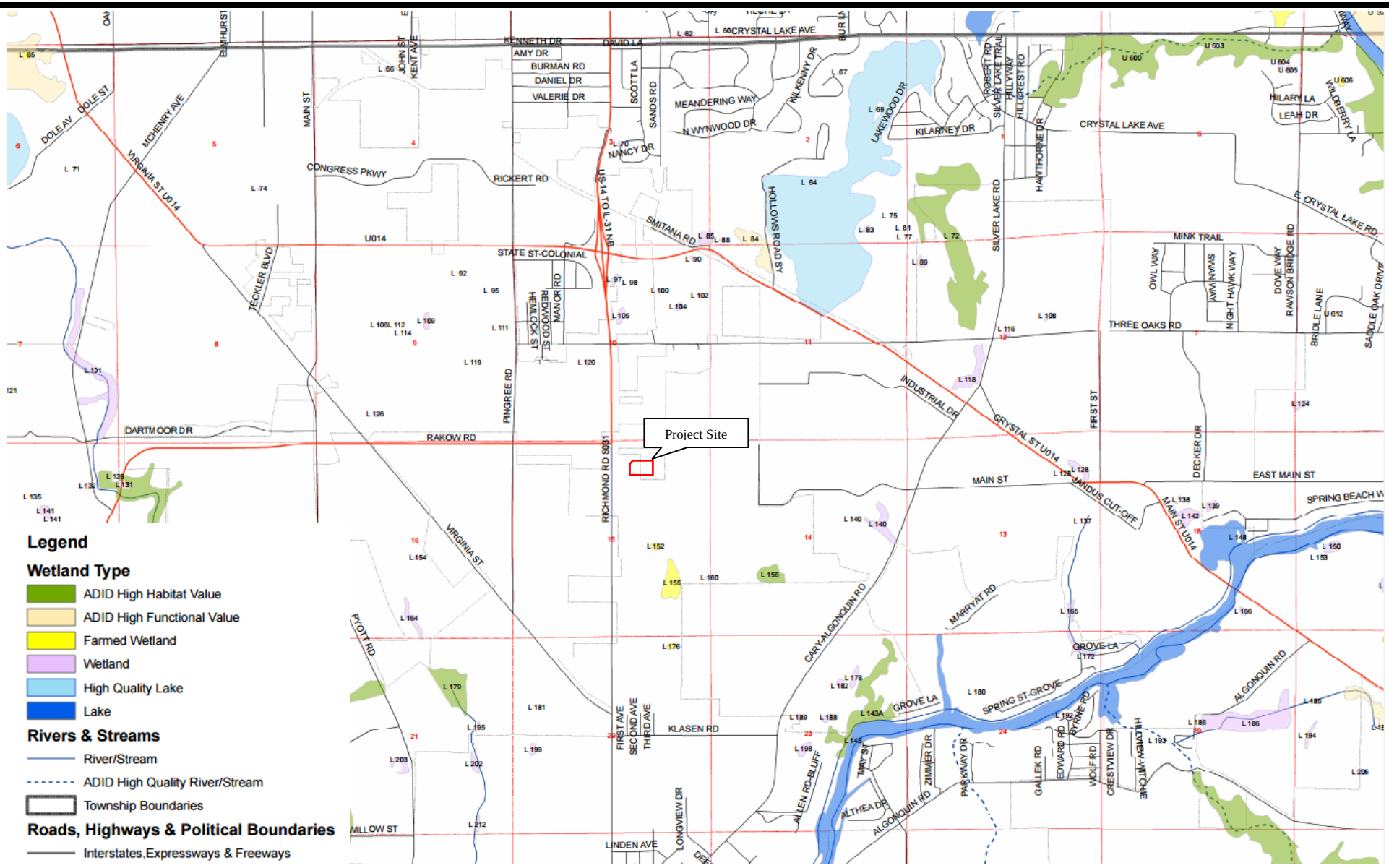
UNITED CONSULTING — We're here for you	N	Scale:	1"=2,000'	Client:	CEI
		Prepared:	BTK	Site:	Murphy USA- Crystal Lake, IL
		Checked:	LJD		
		Project No.:	2014.4653.02	Title:	USGS Topographic Map

FIG. 2



UNITED CONSULTING — We're here for you	N	Scale:	As Shown	Notes:	Client:	CEI
		Prepared:	BTK		Site:	Murphy USA Crystal Lake, IL
		Checked:	LJD		Title:	FWS NWI Map
		Project No.:	2014.4653.02			

FIG. 3



UNITED CONSULTING	N	Scale:	As Shown	Notes:	Client: CEI
		Prepared:	BTK		Site: Murphy USA Crystal Lake, IL
		Checked:	LJD		Title: ADID Map
		Project No.:	2014.4653.02		FIG. 4



Private Potable Water Well

Crystal Lake Municipal Wells

UNITED CONSULTING — We're here for you	N	Scale:	As Shown	Notes:	Client:	CEI
		Prepared:	BTK		Site:	Murphy USA Crystal Lake, IL
		Checked:	LJD		Title:	Well Location Map
		Project No.:	2014.4653.02			

FIG. 5

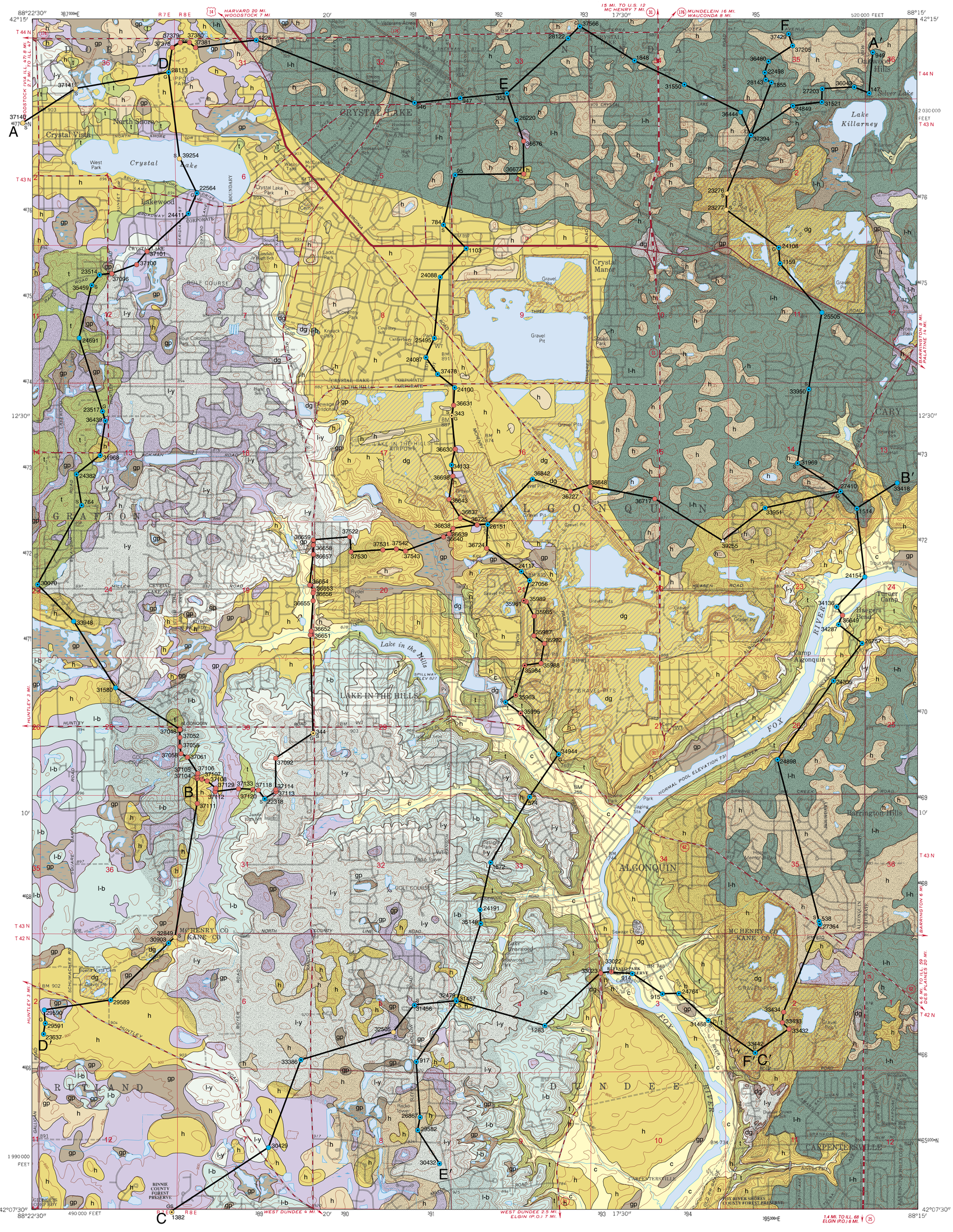
APPENDIX A – ISGS QUARTERANGLE MAP FOR CRYSTAL LAKE, ILLINOIS

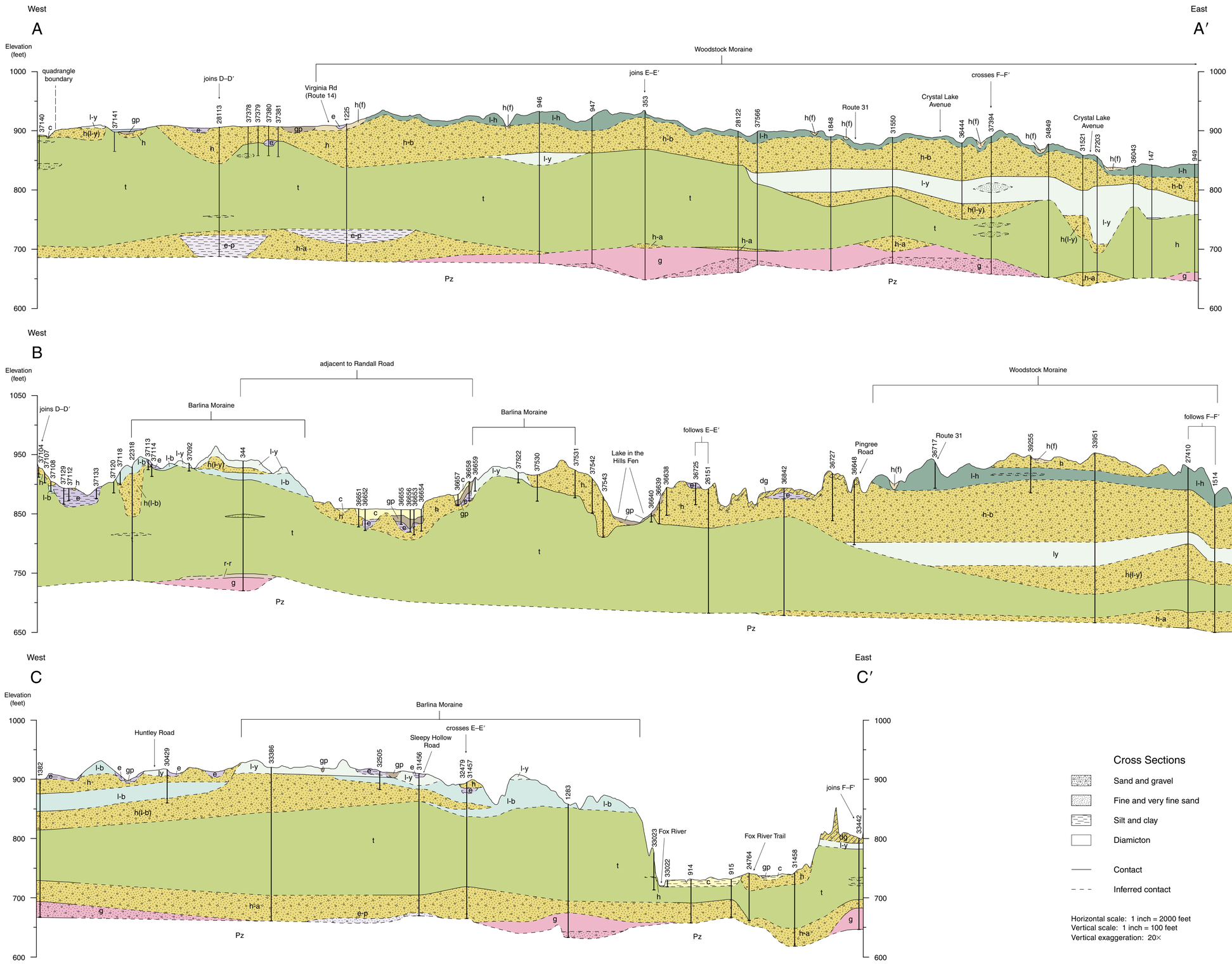
SURFICIAL GEOLOGY OF CRYSTAL LAKE QUADRANGLE
MCHENRY AND KANE COUNTIES, ILLINOIS

Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
William W. Shilts, Chief

B. Brandon Curry
2005

Illinois Geologic Quadrangle Map
IGQ Crystal Lake-SG


CRYSTAL LAKE
LAKE IN THE HILLS
ALGONQUIN
CARPENTERSVILLE
HUNTLEY
GRAFTON
DUNDEE
RUTLAND
GILBERTS
CRYSTAL LAKE
LAKE IN THE HILLS
HUNTLEY
ALGONQUIN
CARPENTERSVILLE
Crystal Lake
Lake in the Hills
Lake Killarney
Silver Lake
Crystal Manor
Lakewood
North Shore
Crystal Vista
Oakwood Hills
Barrington Hills
Turner Camp
Camp Algonquin
Haegers Bend
Gravel Pit
Gravel Pits
Sewage Disposal
Golf Course
Cemetery
Sch
Park
Pond
Tower
Sta
Airport
Fox River
Nippold Park
Ladd Park
Knuckey Park
Coventry Park
Coventry Sch
Canterbury Sch
Four Colonies Park
Crystal Lake Park
South Sch
High Sch
Junior High Sch
Ridgefield Park
Trout Valley Park
Andres Park
Stoehr Park
Boone Creek Park
Raintree Park
Lippold Park
Ryder
Kern
Laging
Hoosier Manor
Sawbill Camp
Lake Owaissa
Lake Defiance
Lake Arrowwood
Lake Shonaqua
Lake Tamarack
Lake Tanaqua
Lake Terrace
Lake Tonkawa
Lake Tonquish
Lake Tonquish Dam
Lake Tonquish Spillway
Lake Tonquish Outlet
Lake Tonquish Inlet
Lake Tonquish Overflow
Lake Tonquish Emergency Spillway
Lake Tonquish Auxiliary Spillway
Lake Tonquish Principal Spillway
Lake Tonquish Service Spillway
Lake Tonquish Control Structure
Lake Tonquish Gate
Lake Tonquish Valve
Lake Tonquish Meter
Lake Tonquish Recorder
Lake Tonquish Gauge
Lake Tonquish Staff Gauge
Lake Tonquish Crest Gauge
Lake Tonquish Rain Gauge
Lake Tonquish Evaporation Pan
Lake Tonquish Weather Station
Lake Tonquish Observation Well
Lake Tonquish Monitoring Well
Lake Tonquish Test Well
Lake Tonquish Production Well
Lake Tonquish Injection Well
Lake Tonquish Recovery Well
Lake Tonquish Dewatering Well
Lake Tonquish Sump
Lake Tonquish Pump
Lake Tonquish Motor
Lake Tonquish Generator
Lake Tonquish Transformer
Lake Tonquish Switchgear
Lake Tonquish Control Panel
Lake Tonquish Telemetry
Lake Tonquish Antenna
Lake Tonquish Tower
Lake Tonquish Building
Lake Tonquish Shed
Lake Tonquish Garage
Lake Tonquish Office
Lake Tonquish Maintenance Shop
Lake Tonquish Storage Yard
Lake Tonquish Parking Lot
Lake Tonquish Access Road
Lake Tonquish Boat Ramp
Lake Tonquish Fishing Pier
Lake Tonquish Swimming Beach
Lake Tonquish Picnic Area
Lake Tonquish Campground
Lake Tonquish Golf Course
Lake Tonquish Clubhouse
Lake Tonquish Pro Shop
Lake Tonquish Restaurant
Lake Tonquish Snack Bar
Lake Tonquish Restroom
Lake Tonquish Shower
Lake Tonquish Locker Room
Lake Tonquish Laundry
Lake Tonquish Vending Machine
Lake Tonquish Pay Phone
Lake Tonquish Mailbox
Lake Tonquish Trash Can
Lake Tonquish Recycling Bin
Lake Tonquish Compost Bin
Lake Tonquish Dumpster
Lake Tonquish Landfill
Lake Tonquish Transfer Station
Lake Tonquish Recycling Center
Lake Tonquish Composting Facility
Lake Tonquish Waste Treatment Plant
Lake Tonquish Water Treatment Plant
Lake Tonquish Sewage Treatment Plant
Lake Tonquish Wastewater Treatment Plant
Lake Tonquish Stormwater Treatment Plant
Lake Tonquish Detention Basin
Lake Tonquish Retention Basin
Lake Tonquish Infiltration Basin
Lake Tonquish Recharge Basin
Lake Tonquish Wetland
Lake Tonquish Marsh
Lake Tonquish Swamp
Lake Tonquish Bog
Lake Tonquish Fen
Lake Tonquish Prairie
Lake Tonquish Savanna
Lake Tonquish Woodland
Lake Tonquish Forest
Lake Tonquish Grassland
Lake Tonquish Meadow
Lake Tonquish Pasture
Lake Tonquish Cropland
Lake Tonquish Orchard
Lake Tonquish Vineyard
Lake Tonquish Nursery
Lake Tonquish Greenhouse
Lake Tonquish Farm
Lake Tonquish Ranch
Lake Tonquish Stable
Lake Tonquish Barn
Lake Tonquish Silo
Lake Tonquish Windmill
Lake Tonquish Water Tower
Lake Tonquish Grain Elevator
Lake Tonquish Feed Mill
Lake Tonquish Creamery
Lake Tonquish Cheese Factory
Lake Tonquish Winery
Lake Tonquish Brewery
Lake Tonquish Distillery
Lake Tonquish Bottling Plant
Lake Tonquish Canning Plant
Lake Tonquish Packing Plant
Lake Tonquish Processing Plant
Lake Tonquish Manufacturing Plant
Lake Tonquish Industrial Park
Lake Tonquish Business Park
Lake Tonquish Office Park
Lake Tonquish Research Park
Lake Tonquish Technology Park
Lake Tonquish Science Park
Lake Tonquish Medical Park
Lake Tonquish Hospital
Lake Tonquish Clinic
Lake Tonquish Pharmacy
Lake Tonquish Dentist
Lake Tonquish Doctor
Lake Tonquish Veterinarian
Lake Tonquish Animal Hospital
Lake Tonquish Animal Shelter
Lake Tonquish Animal Control
Lake Tonquish Police Station
Lake Tonquish Fire Station
Lake Tonquish Ambulance
Lake Tonquish Emergency Room
Lake Tonquish Urgent Care
Lake Tonquish Walk-In Clinic
Lake Tonquish Nursing Home
Lake Tonquish Assisted Living
Lake Tonquish Retirement Home
Lake Tonquish Senior Center
Lake Tonquish Community Center
Lake Tonquish Recreation Center
Lake Tonquish Fitness Center
Lake Tonquish Gym
Lake Tonquish Swimming Pool
Lake Tonquish Tennis Court
Lake Tonquish Basketball Court
Lake Tonquish Volleyball Court
Lake Tonquish Soccer Field
Lake Tonquish Baseball Field
Lake Tonquish Softball Field
Lake Tonquish Football Field
Lake Tonquish Track
Lake Tonquish Golf Course
Lake Tonquish Driving Range
Lake Tonquish Putting Green
Lake Tonquish Sand Trap
Lake Tonquish Water Hazard
Lake Tonquish Fairway
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Lake Tonquish Green
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Lake Tonquish Par
Lake Tonquish Bogey
Lake Tonquish Birdie
Lake Tonquish Eagle
Lake Tonquish Albatross
Lake Tonquish Ace
Lake Tonquish Handicap
Lake Tonquish Course Rating
Lake Tonquish Slope Rating
Lake Tonquish Yardage
Lake Tonquish Scorecard
Lake Tonquish Pro
Lake Tonquish Caddy
Lake Tonquish Cart
Lake Tonquish Bag
Lake Tonquish Club
Lake Tonquish Ball
Lake Tonquish Tee
Lake Tonquish Glove
Lake Tonquish Shoe
Lake Tonquish Hat
Lake Tonquish Shirt
Lake Tonquish Pants
Lake Tonquish Shorts
Lake Tonquish Skirt
Lake Tonquish Dress
Lake Tonquish Jacket
Lake Tonquish Coat
Lake Tonquish Sweater
Lake Tonquish Vest
Lake Tonquish Tie
Lake Tonquish Belt
Lake Tonquish Socks
Lake Tonquish Underwear
Lake Tonquish Bra
Lake Tonquish Panties
Lake Tonquish Boxers
Lake Tonquish Briefs
Lake Tonquish Thong
Lake Tonquish Boxer Briefs
Lake Tonquish Long Johns
Lake Tonquish Pajamas
Lake Tonquish Robe
Lake Tonquish Slippers
Lake Tonquish Sandals
Lake Tonquish Boots
Lake Tonquish Flip-Flops
Lake Tonquish Sneakers
Lake Tonquish Dress Shoes
Lake Tonquish Work Boots
Lake Tonquish Hiking Boots
Lake Tonquish Cowboy Boots
Lake Tonquish High Heels
Lake Tonquish Flats
Lake Tonquish Wedges
Lake Tonquish Platforms
Lake Tonquish Stilettos
Lake Tonquish Pumps
Lake Tonquish Mules
Lake Tonquish Clogs
Lake Tonquish Espadrilles
Lake Tonquish Moccasins
Lake Tonquish Loafers
Lake Tonquish Oxfords
Lake Tonquish Brogues
Lake Tonquish Wingtips
Lake Tonquish Saddle Shoes
Lake Tonquish Spectators
Lake Tonquish Two-Tones
Lake Tonquish Monk Straps
Lake Tonquish Buckle Shoes
Lake Tonquish Slip-Ons
Lake Tonquish Boat Shoes
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Lake Tonquish Aqua Socks
Lake Tonquish Neoprene Boots
Lake Tonquish Rain Boots
Lake Tonquish Galoshes
Lake Tonquish Overshoes
Lake Tonquish Shoe Covers
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Lake Tonquish Shoe Mummy
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Lake Tonquish Shoe Wolfman
Lake Tonquish Shoe Invisible Man
Lake Tonquish Shoe Phantom of the Opera
Lake Tonquish Shoe Hunchback of Notre Dame
Lake Tonquish Shoe Beauty and the Beast
Lake Tonquish Shoe Cinderella
Lake Tonquish Shoe Snow White
Lake Tonquish Shoe Sleeping Beauty
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Lake Tonquish Shoe Pinocchio
Lake Tonquish Shoe Peter Pan
Lake Tonquish Shoe Wendy
Lake Tonquish Shoe Tinker Bell
Lake Tonquish Shoe Captain Hook
Lake Tonquish Shoe Smee
Lake Tonquish Shoe Mr. Darling
Lake Tonquish Shoe Mrs. Darling
Lake Tonquish Shoe Nana
Lake Tonquish Shoe Michael
Lake Tonquish Shoe John
Lake Tonquish Shoe Lost Boys
Lake Tonquish Shoe Indians
Lake Tonquish Shoe Pirates
Lake Tonquish Shoe Mermaids
Lake Tonquish Shoe Crocodile
Lake Tonquish Shoe Tick-Tock
Lake Tonquish Shoe Hook's Ship
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West
A
East
A′
Elevation (feet)
Woodstock Moraine
quadrangle boundary
joins D–D′
Virginia Rd (Route 14)
joins E–E′
crosses F–F′
Route 31
Crystal Lake Avenue
Crystal Lake Avenue
West
B
East
B′
Elevation (feet)
adjacent to Randall Road
Barlina Moraine
Barlina Moraine
Woodstock Moraine
joins D–D′
follows E–E′
follows F–F′
Lake in the Hills Fen
Pingree Road
Route 31
West
C
East
C′
Elevation (feet)
Barlina Moraine
Huntley Road
Sleepy Hollow Road
crosses E–E′
joins F–F′
Fox River
Fox River Trail
Cross Sections
Sand and gravel
Fine and very fine sand
Silt and clay
Diamicton
Contact
Inferred contact
Horizontal scale: 1 inch = 2000 feet
Vertical scale: 1 inch = 100 feet
Vertical exaggeration: 20×
North
D
South
D′
Elevation (feet)
joins A–A′
Crystal Lake
Huntley Road
Ackman Road
Miller Road
Algonquin Road
joins B–B′
North County Line Road
North
E
South
E′
Elevation (feet)
Woodstock Moraine
joins A–A′
Crystal Lake Road
Hwy 14
Virginia Road
follows Pyott Road
follows B–B′
Barlina Moraine
Algonquin Road
North County Line Road
crosses C–C′
North
F
South
F′
Elevation (feet)
Woodstock Moraine
crosses A–A′
Crystal Lake Avenue
Route 14
follows B–B′
Algonquin-Cary Road
Fox River
River Road
Spring Creek Road
North County Line Road
joins C–C′
Pz

Purpose

This surficial geology map identifies, describes, and locates near-surface geologic materials relevant to the many environmental and economic issues in this growing metropolitan area. The Crystal Lake Quadrangle is home to approximately 100,000 residents, including the municipalities of Crystal Lake (38,000; Illinois Census 2000), Carpentersville (30,586), Algonquin (23,276), Lake in the Hills (23,152), Cary (15,531), Huntley (5,730), and Lakewood (2,337).

There are several noteworthy geologic and hydrogeologic concerns of the Crystal Lake area, including these:

- Potential reserves of sand and gravel aggregate; the Crystal Lake area has been a center for sand and gravel mining in northeastern Illinois for more than half a century (Masters 1978, Cobb and Fraser 1981).
- The quality and quantity of groundwater used in municipal and private drinking water supplies and location of aquifers in the glacial drift; about three fourths of the quadrangle's groundwater is pumped from layers of sand and gravel in the glacial drift (Curry et al. 1997).
- Polluted groundwater, such as at the Precision Twist site in Sec. 33, T43N, R8E, and the old McHenry County Landfill Superfund Site in Sec. 3, T42N, R8E, in Crystal Lake (Patrick McNulty, McHenry County Department of Health, personal communication; Illinois Environmental Protection Agency, personal communication).
- Eight additional Superfund Sites (Illinois Environmental Protection Agency, personal communication).
- Proposed landfill sites, such as the Pyott Road Landfill of the 1980s (Jennings 1985).
- Local flooding in closed depressions and along streams tributary to the Fox River (Illinois Representative Cal Skinner 2000, personal communication).
- Landslides along U.S. Route 31 at Buffalo Park Forest Preserve in south Algonquin (Illinois Department of Transportation, unpublished report).

The surficial geology map depicts materials encountered below a mantle of weathered, silty soil (loess) within 2 to 4 feet of ground surface. The accompanying cross sections show the vertical dimension of the deposits, including several units that do not appear on the map and are completely buried by younger glacial drift. Other geologic maps that depict features related to the surficial geology map and cross sections include those of the bedrock topography, glacial drift thickness, and thickness of surficial sand and gravel deposits (Curry 2005a, 2005b).

Methods

The sources of data used to prepare the surficial geology map and cross sections are described on the data point locations map (Curry 2005c). These include 8 key stratigraphic borings sampled by Illinois State Geological Survey geologists or by a consulting geologist. Data for these borings in McHenry County are summarized elsewhere (Curry 1995; see also, Lund 1965, Jennings 1985). Other data sources include 11 gamma-ray logs of existing water wells; 184 shallow borings (not to bedrock and, on average, about 50 feet deep) for aggregate exploration, road and other construction, and geological investigation; 104 property evaluation borings (on average, about 15 feet deep); 375 logs from water-well drillers; and 60 outcrops described by the author and other ISGS geologists. Data for many of these borings are available from the ISGS Geological Records Unit.

Different levels of data interpretation were needed to complete the cross sections and map. The highest-quality data (the key stratigraphic borings, borings with gamma-ray logs, and outcrops) were used to prepare preliminary cross sections. Supplemental data were added, where available, along the lines of section; the preliminary cross sections served as guides for interpreting the geometry of sediment layers. After preliminary cross sections were made, surficial geology map unit boundaries were drawn based in part on previous investigations (Curry et al. 1997, Wickham et al. 1988) and interpretations of the Kane County and McHenry County soil survey maps (Goddard 1979, Ray and Wascher 1965, respectively), primarily to delineate areas of peat and alluvium. In some areas, the altitude of unit contacts on the cross sections was adjusted to reflect the mapped distribution of the lithologic units. The smallest map units cover about 1 acre; areas this small generally show small patches of peat or lake sediment in shallow depressions.

Geologic Setting

Glacial deposits mantle most of Illinois. In the Crystal Lake Quadrangle, drift is as much as 290 feet thick (Curry 2005b). In northeastern Illinois, near-surface glacial sediment was deposited during the last glaciation (Wisconsin Episode) from about 24,500 to 15,000 radiocarbon years ago. During this time, the Lake Michigan Lobe, a south-flowing tongue of the Laurentide Ice Sheet, formed numerous subdued ridges with hummocky topography known as moraines. Movement of the Lake Michigan Lobe

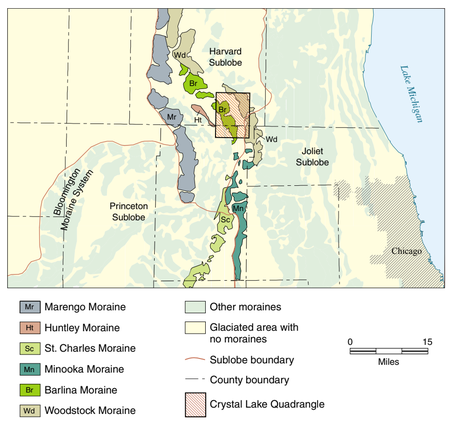


Figure 1 Wisconsin Episode moraines in northeastern Illinois. Moraines were formed near the terminus of glacial ice at various positions of the Lake Michigan Lobe. Glacial ice advanced in a westerly and southwesterly direction into Illinois from the Lake Michigan basin. The older moraines of this figure generally occur to the west and the younger moraines to the east. In the area of the last glaciation, the yellow areas are typically drainageways or plains of outwash, lake sediment, or till. Adapted from Willman and Frye (1970) and Hansel and Johnson (1996).

was complex and, at times, sublobes with unique flow patterns formed distinctive tracts of moraines (fig. 1). The sublobes melted back and readvanced several times during the Wisconsin Episode glaciation; each moraine represents the sediment deposited at the glacial margin during separate readvances. Meltwater carried and deposited sand and gravel atop, below, and through the glacier, as well as along drainageways beyond the moraines (fig. 2). In some low areas, meltwater deposited fine-grained lake sediment.

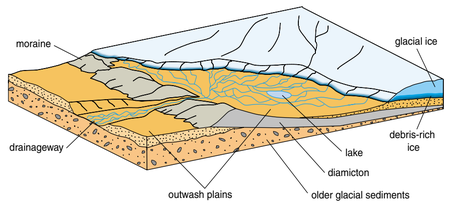


Figure 2 Conceptual model of landform and sediment assemblages associated with the margins of continental glaciers (Curry et al. 1997).

Glacial History

The succession of Quaternary glacial sediments in northeastern Illinois was deposited on an unconformity formed on Paleozoic bedrock. In the northern two thirds of the Crystal Lake Quadrangle, the bedrock underlying the drift is composed of primarily Silurian age dolomite of the Wilhelmi, Elwood, and Kankakee Formations (Graese et al. 1988). As much as about 70 feet thick in the northern part of the quadrangle, Silurian dolomites pinch out to the south. In the southern third of the quadrangle, the bedrock underlying the glacial drift is composed of shaly dolomite of the Ordovician Maquoketa Group (Graese 1991, Graese et al. 1988, Curry 2005a). Prior to and during the Quaternary Period (from about 1.8 million years ago to the present), the bedrock was eroded to form a landscape with river valleys and intervening uplands. Glacial sand and gravel deposits commonly filled in low areas and valleys on the landscape. Significant drift aquifers occupy deep bedrock valleys in the region, but significant buried bedrock valleys do not occur in the Crystal Lake Quadrangle (Curry 2005a).

The oldest glacial sediment present in the area is deeply buried and occurs below 730 feet above mean sea level. This sediment was deposited during the Illinois Episode about 180,000 to 130,000 years ago (Curry and Pavich 1996) and includes less than 50 feet of till, lake sediment, and outwash of the Glasford Formation (unit g on the cross sections). In places, the old drift is overlain by patchy deposits less than 10 feet thick of buried peat known as the Robein Member of the Roxana Silt (unit r-r; Curry 1989, Curry and Pavich 1996).

At the base of Wisconsin Episode sediments are layers of outwash sand and gravel and lake sediment. These materials were deposited in streams and lakes ahead of the advancing glacier (fig. 2). With time, the glacial ice covered these proglacial sediments and buried them with deposits of till and debris flows of the Tiskilwa Formation. Buried outwash is mapped as the Ashmore Tongue of the Henry Formation (unit h-a) and the lake sediment as the Peddicord Tongue of the Equality Formation (unit e-p). Both units are buried deeply and are shown only on the cross sections. Deposits of the Peddicord Tongue are thin and patchy, but the Ashmore Tongue is more than 70 feet thick in places. The Ashmore Tongue is an important aquifer in many areas in the quadrangle, especially to the south (see cross section C–C′).

The Lake Michigan Lobe reached its terminal position about 24,500 radiocarbon years ago when it began to form the Marengo Moraine about 6 miles west of Crystal Lake (fig. 1). The Marengo Moraine is composed of the Tiskilwa Formation, the thickest and most lithologically uniform glacial drift unit in the region (Wickham et al. 1988). The uniform matrix texture, great thickness, paucity of significantly thick and continuous sand and gravel lenses (Wickham et al. 1988, Curry et al. 1997), and sedimentology (Curry et al. 1999) collectively imply that most Tiskilwa diamicton is till that was deposited in a subglacial environment. The unit tends to contain more lenses and layers of sand and gravel in the northern and eastern parts of the quadrangle than to the south and west.

The direction of ice flow was from east to west during the formation of the Marengo Moraine. After the moraine formed, the direction of ice flow changed dramatically as looping moraines of the Bloomington Morainic System were formed (fig. 1). At the Wedgewood Subdivision in western Crystal Lake (Sec. 3, T42N, R8E), a lake deposit above a layer of Tiskilwa Formation diamicton yielded organic matter dated at 23,230 ± 500 yr before present (BP) (ISGS-2345; Curry et al. 1997). This finding indicates that the ice melted back rapidly from the position of the Marengo Moraine and that a proglacial lake formed between the Marengo Moraine and the Lake Michigan Lobe when the Bloomington Morainic System was formed to the south and west (Curry et al. 1997).

After the Princeton Sublobe melted, the Harvard Sublobe of the Lake Michigan Lobe was active from about 19,000 to 15,000 yr BP (Hansel and Johnson, 1992). The Harvard Sublobe waxed and waned three times across parts of the Crystal Lake Quadrangle (fig. 1). The first readvance reached the position of the Huntley Moraine just to the west of the Crystal Lake Quadrangle, and sediment associated with the Batestown Member was deposited. The second readvance reached the position of the Barlina Moraine, and sediment associated with the Yorkville Member was deposited. The third and final ice margin advanced to the position of the Woodstock Moraine and deposited thick proglacial sand and gravel outwash of the Beverly Tongue (Henry Formation) and sandy loam diamicton of the Haeger Member (Lemont Formation).

As the ice melted from the Crystal Lake Quadrangle, numerous kettle depressions formed on the Woodstock and Barlina Moraines. As melting occurred, the sides of the kettles became unstable, and deposits of sand and diamicton were redeposited in the basins. In Sec. 3, T43N, R8E, cores from two kettles in borings 37144 and 22742 (Curry 2005c) reveal a succession of more than 40 feet of such postglacial sediment classified with a fine-grained facies of the Henry Formation. The lower part is composed of about 20 feet of fossiliferous silt, sand and gravel, and thin beds of loam diamicton; the upper part was 20 feet of oxidized, well-sorted, medium- to fine-grained sand. Fossil stems and leaves yielded radiocarbon ages of 14,610 ± 110 yr BP (ISGS-A-0143) and 14,860 ± 110 yr BP (ISGS-A-0165), suggesting that the Harvard Sublobe had retreated from the area by about 15,000 yr BP. Deposits of fine, sorted sediment of the Equality Formation (map unit e) and peat and marl of the Grayslake Peat (map unit gp) also fill many kettle depressions and other low-lying areas. The thickest known deposit of surficial lake silt and clay (33 feet) was cored in boring 39254 under 42 feet of water in Crystal Lake (see cross section D–D′); spruce wood sampled near the bottom of the core yielded a radiocarbon age of 13,560 ± 90 yr BP (ISGS-4367). The thickness of peat deposits has been measured in only a few places in the map area. The maximum thickness of peat measured at the Lake in the Hills fen is only about 7 feet (center of cross section B–B′).

Also during deglaciation, large meltwater floods along the present-day Fox River carved a channel across the Woodstock Moraine. Downstream of the moraine, the floods eroded more than 100 feet of glacial sediment from the Fox River valley, leaving behind large point bars (~1 mi^2) and terraces (fig. 3). The sand and gravel constituting the large point bar on the Crystal Lake Quadrangle was likely deposited contemporaneously with another large point bar deposit in the core of the large, abandoned meander of the Fox River 3 miles south in the Elgin Quadrangle (Curry 1998, Curry et al. 1999; fig. 3). Subtle ridges (scroll bars) on the point bars and scarps on the terraces suggest that flooding was episodic. Postglacial erosion has incised these terraces and, in places, exposed diamicton of the Tiskilwa Formation along several reaches of the Fox River.

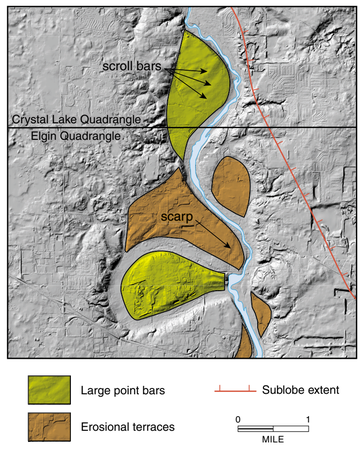


Figure 3 Location of large point bars and erosional terraces along the Fox River in Kane County in the southern part of the Crystal Lake Quadrangle and northern part of the Elgin Quadrangle. The scroll bars evident on the large point bar may be related to the scarps on the erosional terrace immediately to the south. The Fox River has eroded at least 50 feet into the highest parts of these landforms. The maximum extent of the Harvard Sublobe during the Woodstock Phase is shown in brown. Modified from Curry et al. (1999).

The Wedron Group glacial diamicton units, most surficial lake sediment, and coarse outwash are capped by about 3 feet of weathered silty clay and silty clay loam loess known as Peoria Silt (Hansel and Johnson 1996). The loess is generally organic-rich in the upper foot because it contains the modern soil, but, because it is ubiquitous and thin, the Peoria Silt was not mapped.

Most evidence indicates that after the effects of glaciation and its associated flooding abated about 10,000 years ago there has been little modification of the landscape. The most significant change is the infilling of basins such as Crystal Lake, where postglacial lake sediment dating from about 10,000 years old to the present has filled about 30% of the available basin space. Sediment stored as alluvium along the Fox River and its tributaries rarely attains thicknesses of more than 20 feet. These floodplain deposits, classified with the Cahokia Formation, include deposits of gravelly sand, sand, peat, and silty clay.

Landscape-Sediment (Lithofacies) Assemblages

Landscape-sediment assemblages relate the origin and composition of landforms. The glaciated landscape of northeastern Illinois is subdivided into five generalized landscape-sediment assemblages, including (1) lakes and lake plains, (2) outwash plains, (3) drainageways, (4) stream valleys, and (5) moraines. Examples of each are found on the Crystal Lake Quadrangle (fig. 4). Lake plains and lakes are underlain by fine-grained sediment, marl, or peat. Outwash plains are underlain by deposits of sand and gravel deposited in front of glacial margins (fig. 2), such as the one that formed the Woodstock Moraine (fig. 4). Originally eroded by meltwater, drainageways are generally underlain by two kinds of river sediment (alluvium): (1) outwash sand and gravel and (2) finer alluvium of postglacial streams.

The character of the drainageway sediment assemblage changes along the course of the river system depending on variables such as the distance from the meltwater source or the depth to bedrock. The Fox River valley is an outstanding example of a glacial drainageway. Steep slopes often connect the floodplains of glacial drainageways with glaciated uplands (fig. 4). Stream valleys are also floored by alluvium of modern streams, the character of which changes rapidly as the stream approaches its confluence with the master trunk stream. In the Crystal Lake Quadrangle, the master trunk stream is the Fox River. Thick deposits of coarse- to fine-grained alluvium and peat are near the mouths of valleys that are tributary to the Fox River. These deposits are thinner toward the stream's headwaters, where many streams have formed wide floodplains by lateral migration and beveling of the underlying glacial sediment (fig. 4) but with little, if any, alluvium. Moraines formed when glacier margins were relatively

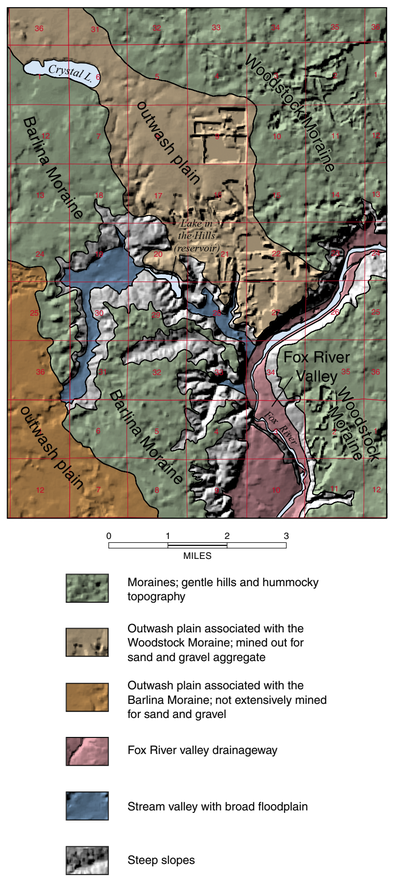


Figure 4 Landform map of the Crystal Lake Quadrangle using the 10-meter USGS digital elevation model of the topographic map. Scale is 1:100,000.

Table 1 Selected physical properties of the most significant stratigraphic units. Mean values are given for most parameters. Hydraulic conductivity values are estimated.

	Stratigraphic Unit							
Material	Tiskilwa diamicton (regional)	Tiskilwa diamicton (local)	Batestown diamicton	Yorkville diamicton	Haeger diamicton	Equality silt and clay	Grayslake peat	Henry sand and gravel
Gravel (%)	7	4	16	10	11	1	2	29
Sand (%)	37	34	43	20	45	8	8	53
Silt (%)	37	33	41	47	37	60	52	32
Clay (%)	26	34	16	33	18	32	40	15
Moisture content (%)	11	12.2	10	14	12	29	112	17
Vertical hydraulic conductivity (cm/sec)	-	10^{-8} to 10^{-9}	10^{-4} to 10^{-5}	10^{-5} to 10^{-6}	10^{-4} to 10^{-5}	10^{-5} to 10^{-6}	-	10^{-2} to 10^{-4}
Liquid limit[1]	-	24	15	25	-	-	-	-
Plastic limit[1]	-	11	12	14	-	-	-	-
Plasticity index[1]	-	13	3	11	-	-	-	-
Reference[2]	1	5	2	2, 4	1	3	3	3
Color (fresh)	red-brown	red-brown	brown	gray	gray	gray	dark brown	brown
Unif. Soil Class.[3]	CL	CL	CL	CL	CL	CL, ML	OH	SC, GW
Samples (no.)	283	25	63	428	25	198	10	113

[1] See Holtz and Kovacs 1981.
[2] Reference: 1 = Curry 1995, 2 = Curry 1991, 3 = Graese et al. 1988, 4 = Kesich 1999, 5 = Jennings 1985.
[3] Unified Soil Classification: CL = lean clay; ML = lean silt; OH = compressible soil; SC = sand, poorly graded; GW = gravel, well graded.

stationary; moraines comprise diamicton and interbedded lenses and sheets of sand and gravel (fig. 2). If moraines formed during a single interval of ice stabilization, such as the Marengo Moraine (fig. 1), the internal sediment architecture may be simple (i.e., composed of one kind of diamicton). Moraines in the Crystal Lake Quadrangle are complex. The Barlina Moraine, for example, was formed when the ice margin readvanced to about the same location at different times. The Barlina Moraine is composed of three lithologically distinctive diamicton units interbedded with sand and gravel.

Materials (Lithostratigraphic Units)

Classification and Terminology

Geologists map geologic materials as lithostratigraphic units, which have unique physical properties (e.g., color and grain-size distribution) and occur in a specific level in the succession of sediment layers (see map and fig. 5). For deposits of the last glaciation, a special distinction is made based on grain size and sorting. Deposits composed of similar-sized grains (i.e., well-sorted sediment or poorly graded sediment) are classified with the Mason Group, whereas deposits composed of a poorly sorted mixture of grain sizes (i.e., diamicton) are classified with the Wedron Group (Hansel and Johnson 1996). Regionally important layers of sand and gravel or fine-grained sediment that occur between named lithostratigraphic units of the Wedron Group are called stratigraphic tongues. Sand and gravel layers that are mappable at a scale of 1:24,000, but do not occur regionally, are unnamed tongues.

"Diamicton" describes a deposit of particles with a wide range of grain sizes, usually from clay to boulders. Most diamicton of glacial origin in Illinois is matrix-supported, meaning that the larger particles (gravel to boulders) are encased in a mixture of finer particles (clay, silt, and sand).

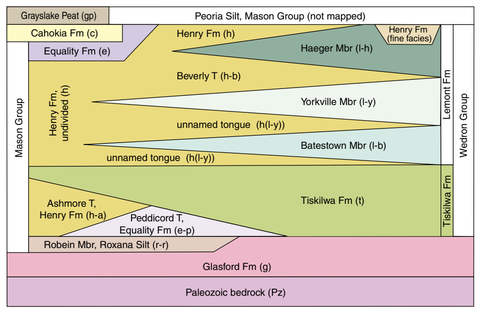


Figure 5 Schematic representation of the spatial relationships among the lithostratigraphic units and associated tongues.

In Illinois, the lithology of a diamicton in a moraine commonly contrasts with that of adjacent moraines. The most commonly used lithological criteria to differentiate among diamicton units include color, particle-size distribution of the <2-mm matrix, and clay mineral composition (Wickham et al. 1988). Quaternary geologists use textural terms such as "loam" and "clay loam" to describe the particle-size distribution of the matrix; the terms are based on the soil texture classification of the U.S. Department of Agriculture (Buol et al. 1980).

Mason Group

Two kinds of materials composed of sorted sediment of the Mason Group are identified in this quadrangle (table 1). One is sand and gravel of the Henry Formation. The other is finer-grained deposits of fine sand, silt, and clay of the Equality Formation. The Henry sand and gravel deposits, especially as they occur at or just below ground surface, can be important sources of aggregate resources or aquifers (Curry and Seaber 1990). Several types of deposits are recognized as part of the Henry Formation. The distinction usually is stratigraphic; that is, the named facies or stratigraphic tongue is dependent on the diamicton unit under which the sand and gravel lies. The fine-grained deposits of the Equality Formation form important local aquitards that impede the movement of groundwater. The Grayslake Peat (peat and marl) and Cahokia Formation (interbeds of sand and gravel, sand, clayey silt, and peat) are special units of the Mason Group. Both units occur in areas prone to flooding. The Grayslake Peat occurs in depressions or at the foot of slopes that receive year-round moisture from groundwater. The Cahokia Formation is the alluvium of postglacial rivers and streams. Due to the very high moisture content and high compressibility, peat, marl, and clayey sediments are not suitable for foundation material, and they often are classified as fat clays or organic soils (Unified Soil Classification System; Holtz and Kovacs 1981). Desiccation of these units caused by drainage may lead to cracking and subsidence.

Wedron Group

Four lithologically distinct diamicton units of the Wedron Group are mapped on the Crystal Lake Quadrangle (table 1). All units classify as lean clays in the Unified Soil Classification System (Holtz and Kovacs 1981). The most diagnostic characteristics of each unit and assessments of the units as aquitards are listed. The stratigraphic nomenclature follows that of Willman and Frye (1970) with modifications to the lithologic units of the last glaciation by Hansel and Johnson (1996).

- Tiskilwa Formation diamicton is reddish-brown, hard, thick, and uniform and has a matrix texture of clay loam to loam. Thick Tiskilwa Formation diamicton is the most significant drift aquitard in the region.
- Batestown Member (Lemont Formation) diamicton is brown, friable when dry (crumbly), thin, sandy, and contains abundant interbeds of sand and gravel.
- Yorkville Member (Lemont Formation) diamicton is gray, very fine-grained, hard, thin, and contains little sand and gravel. In the Crystal Lake Quadrangle, the Yorkville Member contains abundant fractures formed by desiccation and weathering. The Batestown and Yorkville units are leaky aquitards because they are thin, weathered, and contain many interbeds of sand and gravel.
- Haeger Member (Lemont Formation) diamicton is very sandy, very friable, and associated with thick deposits of sand and gravel. The Haeger Member is a very leaky aquitard and is almost everywhere oxidized and weathered.

Acknowledgments

The author thanks the companies and corporations, private land owners, and municipalities who provided access to their properties or water wells for geophysical (gamma-ray) logging. Special thanks goes to the Crystal Lake and Algonquin Park Districts, Meyer Materials Company, Vulcan Materials Company, Layne-Western (Aurora, Illinois) of Layne Christensen Co., Patrick Technologies, Inc., and Testing Service Corporation. The text was improved through suggestions by Timothy Kemmis and Ardith Hansel.

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APPENDIX B – ISGS WATER WELL RECORDS

ILLINOIS STATE GEOLOGICAL SURVEY

Industrial Water Well	Top	Bottom
top soil	0	4
sand & gravel	4	57
gravel	57	60
Total Depth		**60**

Casing: 5" BLACK STEEL 15#/FT from 0' to 60'

Grout: GRAVEL from 0 to 60.

Size hole below casing: 5"

Water from gravel at 57' to 60'.
Static level 30' below casing top which is 1' above GL
Pumping level 35' when pumping at 10 gpm for 4 hours

Permanent pump installed at 40'
on September 18, 1985, with a capacity of 10 gpm

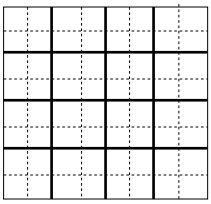
Remarks: owner to take sample

Owner Address: 354 Elmwood Crystal Lake, IL
Address of well: 990 Lutter Dr.
Crystal Lake, IL
Add'l loc. info: Lot: 2 Subdivision: Lutter Indus. Park

Location source: Aerial Photograph verified Verified by: VJA on May 3, 2012.

Permit Date: July 1, 1985 **Permit #:** 118768

COMPANY Nice, Marvin R.
FARM Markel, Jim
DATE DRILLED September 18, 1985 **NO.**
ELEVATION 0GL **COUNTY NO.** 24548
LOCATION NE SW SE
LATITUDE 42.213977 **LONGITUDE** -88.282487
COUNTY McHenry **API** 121112454800 **10 - 43N - 8E**



ILLINOIS STATE GEOLOGICAL SURVEY

Private Water Well	Top	Bottom
topsoil	0	3
gravel	3	80
Total Depth		**80**

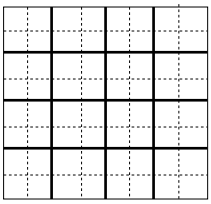
Water from at 80' to '.

Driller's Log filed

Owner Address: Route 31 Barrington, IL
Location source: Location from permit

Permit Date: March 26, 1973 **Permit #:** NF 1828

COMPANY Boetsch, William M.
FARM Strauss Nurseries
DATE DRILLED April 1, 1973 **NO.**
ELEVATION 890 **COUNTY NO.** 01655
LOCATION NW NW NW
LATITUDE 42.210935 **LONGITUDE** -88.295
COUNTY McHenry **API** 121110165500 **15 - 43N - 8E**



ILLINOIS STATE GEOLOGICAL SURVEY

Industrial Water Well	Top	Bottom
topsoil	0	2
clay	2	32
sand & gravel	32	100
clay	100	130
sand & gravel	130	133
gravel	133	135
Total Depth		**135**

Casing: 5" BLACK STEEL 15#/FT from 0' to 135'

Grout: GRAVEL from 0 to 135.

Size hole below casing: 5"

Water from gravel at 133' to 135'.
Static level 40' below casing top which is 1' above GL
Pumping level 50' when pumping at 10 gpm for 4 hours

Permanent pump installed at 80'
on April 3, 1986, with a capacity of 10 gpm

Remarks: owner instructed to take sample

Owner Address: 935 National Ave. Addison, IL

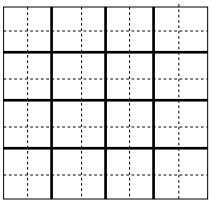
Address of well: 1000 Meyer Drive
Crystal Lake, IL

Add'l loc. info: Lot: 10 Subdivision: Lutter Indus. Park

Location source: Global Positioning System verified Verified by: VJA on May 3, 2012.

Permit Date: November 8, 1985 **Permit #:** 121406

COMPANY Nice, Marvin R.
FARM Idea Display
DATE DRILLED April 3, 1986 **NO.**
ELEVATION 894 **COUNTY NO.** 24790
LOCATION E2 SW SE
LATITUDE 42.213373 **LONGITUDE** -88.283801
COUNTY McHenry **API** 121112479000 **10 - 43N - 8E**



ILLINOIS STATE GEOLOGICAL SURVEY

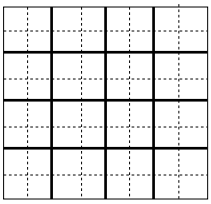
Private Water Well	Top	Bottom
topsoil	0	1
gravel	1	94
Total Depth		**94**

Screen: 4' of 5" diameter 20 slot
Water from gravel at 1' to 93'.

Pumping level 180' when pumping at 8 gpm for 2 hours
Permanent pump installed at 76'
on , with a capacity of gpm
Driller's Log filed
Owner Address: 8119 Rt. 31 Cary, IL
Address of well: same as above
Location source: Aerial Photograph verified Verified by: VJA on May 7, 2012.

Permit Date: December 16, 1974 **Permit #:** 35335

COMPANY Boetsch, William M.
FARM Maas, Kurt
DATE DRILLED December 20, 1974 **NO.**
ELEVATION **COUNTY NO.** 22567
LOCATION NE NE NW
LATITUDE 42.210203 **LONGITUDE** -88.286913
COUNTY **McHenry** **API 121112256700** **15 - 43N - 8E**



ILLINOIS STATE GEOLOGICAL SURVEY

Private Water Well	Top	Bottom
gravel	0	10
clay & gravel	10	30
gravel	30	93
Total Depth		**93**

Casing: 5" 200# PVC from 0' to 89'

Screen: 4' of 5" diameter 30 slot

Grout: DRILLING MUD from 0 to 30.

Size hole below casing: 7.87"

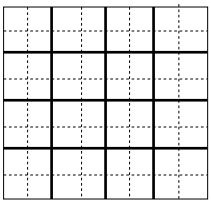
Water from gravel at 30' to 93'.
Static level 40' below casing top which is 1' above GL
Pumping level 50' when pumping at 10 gpm for 3 hours

Permanent pump installed at 60'
on January 7, 1987, with a capacity of 10 gpm

Owner Address: 8742 Lutter Dr. Crystal Lake, IL
Location source: Location from permit

Permit Date: August 22, 1986 **Permit #:** 126175

COMPANY Huemann, William F.
FARM Mid States Construction
DATE DRILLED January 6, 1987 **NO.**
ELEVATION **COUNTY NO.** 25346
LOCATION NE SW SE
LATITUDE 42.214506 **LONGITUDE** -88.282839
COUNTY **McHenry** **API 121112534600** **10 - 43N - 8E**



ILLINOIS STATE GEOLOGICAL SURVEY

Private Water Well	Top	Bottom
clay & gravel	0	16
gravel	16	32
clay & gravel	32	52
gravel	52	82
Total Depth		**82**

Casing: 5" 200# PVC from 0' to 78'

Screen: 4' of 5" diameter 15 slot

Grout: DRILLING MUD from 0 to 52.

Size hole below casing: 7.87"

Water from gravel at 52' to 82'.
Static level 52' below casing top which is 1' above GL
Pumping level 61' when pumping at gpm for 4 hours

Permanent pump installed at 70'
on December 6, 1989, with a capacity of 9 gpm

Owner Address: 8415 S. Route 31 Cary, IL

Address of well: same as above

Location source: Global Positioning System verified Verified by: VJA on May 7, 2012.

Permit Date: July 26, 1989 **Permit #:** 013357

COMPANY Huemann, William F.

FARM Builders Unlimited

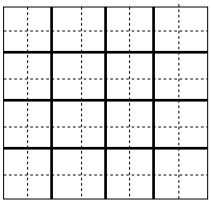
DATE DRILLED December 4, 1989 **NO.**

ELEVATION 892GL **COUNTY NO.** 30104

LOCATION SE SE NW

LATITUDE 42.206242 **LONGITUDE** -88.286824

COUNTY McHenry **API** 121113010400 **15 - 43N - 8E**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well for Commercial Operation	Top	Bottom
top soil	0	1
clay & gravel	1	15
dry gravel	15	61
good gravel	61	88
Total Depth		**88**

Casing: 5" 200# PVC from 0' to 84'
Screen: 4' of 5" diameter 25 slot
Grout: DRILLING MUD from 0 to 25.

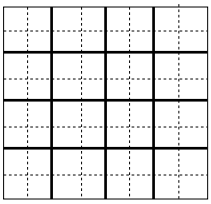
Size hole below casing: 7.87"

Water from gravel at 61' to 88'.
Static level 45' below casing top which is 1' above GL
Pumping level 50' when pumping at gpm for 4 hours
Permanent pump installed at 60'
on August 29, 1986, with a capacity of 50 gpm

Owner Address: %William Tonyan & Sons 7817 S. Rt. 31 Crystal Lake, IL
Address of well: 7718 Rt. 31
Crystal Lake, IL
Location source: Field verified Verified by: BBC on June 1, 1999.

Permit Date: January 29, 1986 **Permit #:** 122150

COMPANY Huemann, William F.
FARM Northwest Newspaper
DATE DRILLED August 28, 1986 **NO.**
ELEVATION 902GL **COUNTY NO.** 24858
LOCATION 1800'S line, 2200'W line of section
LATITUDE 42.216782 **LONGITUDE** -88.288073
COUNTY McHenry **API** 121112485800 **10 - 43N - 8E**



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well for Commercial Operation	Top	Bottom
clay & gravel	0	10
gravel	10	90
Total Depth		**90**

Casing: 5" 200# PVC from 0' to 86'

Screen: 4' of 5" diameter 20 slot

Grout: DRILLING MUD from 0 to 75.

Size hole below casing: 7.87"

Water from gravel at 10' to 90'.
Static level 24' below casing top which is 1' above GL
Pumping level 40' when pumping at 25 gpm for 5 hours

Permanent pump installed at 60'
on January 11, 1983, with a capacity of 15 gpm

Driller's Log filed

Owner Address: 7900 S. Rt. 31 Crystal Lake, IL

Address of well: same as above

Location source: Global Positioning System verified Verified by: VJA on May 3, 2012.

Permit Date: November 22, 1982 **Permit #:** 105677

COMPANY Huemann, William F.

FARM Frett, Joseph & Son, Inc.

DATE DRILLED January 6, 1983 **NO.**

ELEVATION 895GL **COUNTY NO.** 24069

LOCATION NW SW SE

LATITUDE 42.21411 **LONGITUDE** -88.285682

COUNTY McHenry **API 121112406900** **10 - 43N - 8E**

ILLINOIS STATE GEOLOGICAL SURVEY

Water Well for Commercial Operation	Top	Bottom
black loam	0	5
gravel, sand	5	30
gray clay, gravel, sand	30	35
gravel, sand	35	90
Total Depth		**90**

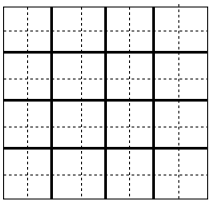
Casing: 6" PVC from 1' to 78'
Screen: 12' of 5" diameter 25 slot
Size hole below casing: 6"

Water from gravel at 35' to 90'.
Static level 40' below casing top which is 1' above GL
Pumping level 60' when pumping at 70 gpm for 2 hours
Permanent pump installed at 63'
on June 4, 1980, with a capacity of 30 gpm
Driller's Log filed

Owner Address: Box 332 Palatine Rd. Barrington, IL
Location source: Location from permit

Permit Date: June 3, 1980 **Permit #:** 94171

COMPANY Boetsch, William M.
FARM Straus Nursery
DATE DRILLED June 3, 1980 **NO.**
ELEVATION 888GL **COUNTY NO.** 24111
LOCATION 30'S 260'W NE/c NW
LATITUDE 42.211739 **LONGITUDE** -88.287451
COUNTY McHenry **API** 121112411100 **15 - 43N - 8E**



ILLINOIS STATE GEOLOGICAL SURVEY

Semi-Private Water Well	Top	Bottom
brown clay	0	20
sand & gravel	20	80
gravel at	80	80
Total Depth		**80**

Casing: 6" PVC from 0' to 65'

Screen: 15' of 6" diameter 25 slot

Grout: CLAY BENTONITE from 0 to 65.

Water from gravel at 45' to 80'.
Static level 45' below casing top which is 1' above GL
Pumping level 45' when pumping at 37 gpm for 3 hours

Permanent pump installed at 63'
on June 23, 1994, with a capacity of 250 gpm

Owner Address: 8109 Rt. 31 Cary, IL

Address of well: same as above

Location source: Tax record verified Verified by: VJA on May 7, 2012.

Permit Date: March 24, 1994 **Permit #:** 111-F82

COMPANY Snelten, Richard Charles

FARM The Barn Nursery

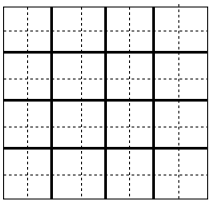
DATE DRILLED April 11, 1994 **NO.**

ELEVATION **COUNTY NO.** 33050

LOCATION NE NE NW

LATITUDE 42.210921 **LONGITUDE** -88.287703

COUNTY **McHenry** **API 121113305000** **15 - 43N - 8E**



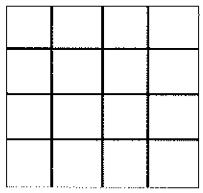
Municipal Wells

 ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
topsoil	0	4
sand and gravel	4	5
gravel and boulders	5	50
gravel and boulders with lot of sand	50	75
sand and gravel	75	120
sand and gravel some clay	120	125
gravel and clay	125	145
gray clay	145	150
clay	150	155
clay with coarse sandy gravel	155	215
clay with slight amount lime	215	220
lime with shaly gravel	220	225
lot of lime with broken sand shale & gvl	225	245
lime	245	250
lime set 26" surface pipe	250	252
lime	252	255
gray and brownish lime	255	280
gray and brownish lime with slgt amt sh	280	285
broken lime with shale and some sand	285	290
lime shale and some dolomite	290	300
lime	300	305
lime with some green shale	305	330
shaly lime with dolomite	330	340
very fine grained s w/wh lime & blsh sh	340	345

Permit Date: **Permit #:** 20619

COMPANY Miller, J.P. Artesian Well Co.
FARM Crystal Lake, City of
DATE DRILLED March 1, 1973 **NO.** 8
ELEVATION 900GL **COUNTY NO.** 01586
LOCATION 1550'S line, 720'E line of SE
LATITUDE 42.21604 **LONGITUDE** -88.318438
COUNTY McHenry **API** 121110158600 **8 - 43N - 8E**



gray lime	975	985
gray lime with quite lot sand	985	1005
lot of sandy lime with dolomite	1005	1015
lime and chert	1015	1020
sandy lime with dolomite brown shale	1020	1025
white sand spkd w/gry lime and brn shale	1025	1030
calcareous sand with specks brown shale	1030	1035
mostly all sand with some lime	1035	1040
sandy lime	1040	1045
sandy lime	1045	1065
white sand	1065	1170
white sand specked with dolomite	1170	1175
white sand	1175	1200
white sand specked with dolomite	1200	1275
reddish white sand specked with dolomite	1275	1295
bluish green, red shale with sandy lime	1295	1300
Interpretation by: E. Atherton on 01-DEC-76		
soil, very dark grayish brown, non-calcareous (base from drillers log)	0	3.5
gravel, very fine	3.5	35
gravel, very fine; till, pinkish gray, calcareous	35	60
gravel, very fine to fine	60	75
till, pinkish brown, calcareous; gravel, very fine	75	175
gravel, very fine	175	220

vesicular		
dolomite, light brownish gray, little light gray, fine to little medium, vesicular in part in	615	625
dolomite, light brownish gray, gray, in part speckled, very fine to fine; shale partings, dark gray, dark brown	625	635
dolomite, light brownish gray, very fine to fine	635	655
dolomite, as above; little dolomite, gray, very fine	655	675
dolomite, gray, light brownish gray, light grayish brown, mottled, very fine, extra fine	675	695
dolomite, light brownish gray, very fine	695	705
dolomite, light brownish gray, little gray, extra fine	705	715
dolomite, as above; shale partings, dark gray, dark brown	715	740
dolomite, light brownish gray, very fine; little dolomite, extra sandy, light gray, with fine to coarse rounded sand grains	740	765
sandstone, white, fine to medium, rounded, incoherent; dolomite, light brownish gray, very fine	765	775
sandstone, white, very fine to fine, few medium grains, rounded, incoherent; dolomite, as above	775	810
sandstone, white, fine to coarse, rounded, frosted, incoherent; dolomite, as above	810	845
dolomite and sandstone, as above; little dolomite, sandy, light gray, little green, sublithographic, with very fine sand grains	845	850
sandstone, white, fine to medium, rounded, frosted, incoherent	850	855

sandstone, very glauconitic, light greenish gray, fine, rounded, incoherent	1090	1095
sandstone, as above, in part red; shale, red, little light green	1095	1125
sandstone, white, fine to coarse, rounded, incoherent; little dolomite, sandy, very light gray to light brownish gray, dense	1125	1135
sandstone, white, fine to very coarse, rounded, frosted, incoherent; little dolomite, sandy, very light gray, light brownish gray, pink, very fine, glauconitic in part	1135	1150
same; sandstone is very fine to very coarse	1150	1190
same, with pyritic sandstone	1190	1200
same, sandstone is partly bimodal, very fine and coarse	1200	1210
sandstone, white, very fine to fine, angular to rounded, incoherent, few medium and coarse grains; very little dolomite, as above	1210	1215
sandstone, white, very fine to fine, little medium to coarse, angular to rounded, incoherent	1215	1225
same, very fine to coarse	1225	1230
same, in part bimodal, mostly very fine to medium to coarse, friable to incoherent	1230	1245
sandstone, white, very fine to medium, angular to rounded, incoherent	1245	1260
same, very fine to coarse	1260	1265
same, in part bimodal, very fine and medium to coarse	1265	1270
sandstone, white, very fine to coarse, angular to rounded, incoherent; little siltstone, sandy, pink to	1270	1275