

## **Memorandum**

Date: May 29, 2015

To: Jason Snyder (Jacob & Hefner)

Copies to: John Kenney (The Pizzuti Companies)

From: Rishab Mahajan, PE, CFM  
Matt Bardol, PE, CFM, DWRE

Subject: Spangler Parcel with Panattoni Site Hydrologic and Hydraulic Analysis

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### **PURPOSE**

The purpose of this memorandum is to summarize the results of the hydrologic and hydraulic analysis of the proposed Spangler Parcel development along with the adjacent Panattoni development. This analysis is a supplement to the Conditional Letter of Map Revision (CLOMR) dated May 29<sup>th</sup>, 2015 for the Spangler Parcel.

Based on the findings of the CLOMR analysis, the existing condition floodplain is fully contained within the Spangler Parcel. The floodplain does not extend onto the Panattoni site. The proposed development on the Spangler parcel will fully contain the floodplain within the proposed stormwater management basins. The CLOMR assumes the Panattoni site is undeveloped, which produces a higher peak flow to the Spangler basins. Even with the higher flows, the floodplain will be fully contained within the proposed basins. When the Panattoni site is developed, the peak flows discharged into the Spangler basins will be greatly reduced, resulting in a slight reduction of the high water level in the basins.

Since the proposed Spangler development can fully contain the floodplain within the proposed basins, with or without the proposed development on the Panattoni site, it is recommended to base the CLOMR only on the Spangler Parcel development. This approach provides a slightly conservative condition. If the CLOMR is based on both the Spangler and Panattoni developments, the final Letter of Map Revision (LOMR) could not be obtained until both developments are constructed and record drawings are obtained of both basins and the associated outfalls. By basing the CLOMR only on the Spangler parcel, the LOMR can be processed upon

the completion of the Spangler parcel record drawings. The CLOMR and LOMR will remove the Panattoni site from regulatory floodplain.

### **Spangler Parcel with Panattoni Development Analysis**

Within the ultimate condition model that includes both the Spangler and Panattoni developments, Subcatchment S5 in the CLOMR analysis was subdivided into multiple drainage areas based on the Panattoni development. The undeveloped area to the south of the Spangler Parcel (Subcatchment S5) was reduced to 25.94 ac. The proposed “Panattoni” parcel was subdivided and routed through a proposed stormwater management basin based on the information provided by Spaceco Inc. The Panattoni site is situated on the existing ridgeline between Mink Creek to the south and Des Plaines River to the north. The site will be served by a single basin with two outfalls, flows will be diverted based on current drainage patterns. The primary point of discharge will be to the north into the Spangler Basin. Two stage discharge curves were developed based on the design calculations (Attachment 1) to represent the two outfalls. Since EPA-SWMM uses a stage-area table to calculate volume, the provided stage-storage table was converted to a stage-area table (Attachment 2). Schematic diagrams of the existing and proposed condition EPA-SWMM model are presented as **Figures A and B** respectively.

### **Results**

The proposed high water level in the Spangler basin is slightly reduced from 620.8 to 620.5 after the proposed Panattoni development. The limits of the floodplain at the high water level are contained within the proposed stormwater management facility on the Spangler Parcel.

#### **Attachments:**

1. Detention Calculations for Lewis Airport Building (Panattoni Site) by Spaceco Inc
2. Detention Calculation Conversion
3. Proposed Condition SWMM Summary Table – Peak Elevations
4. Proposed Condition SWMM Summary Table – Peak Flows

#### **Figures:**

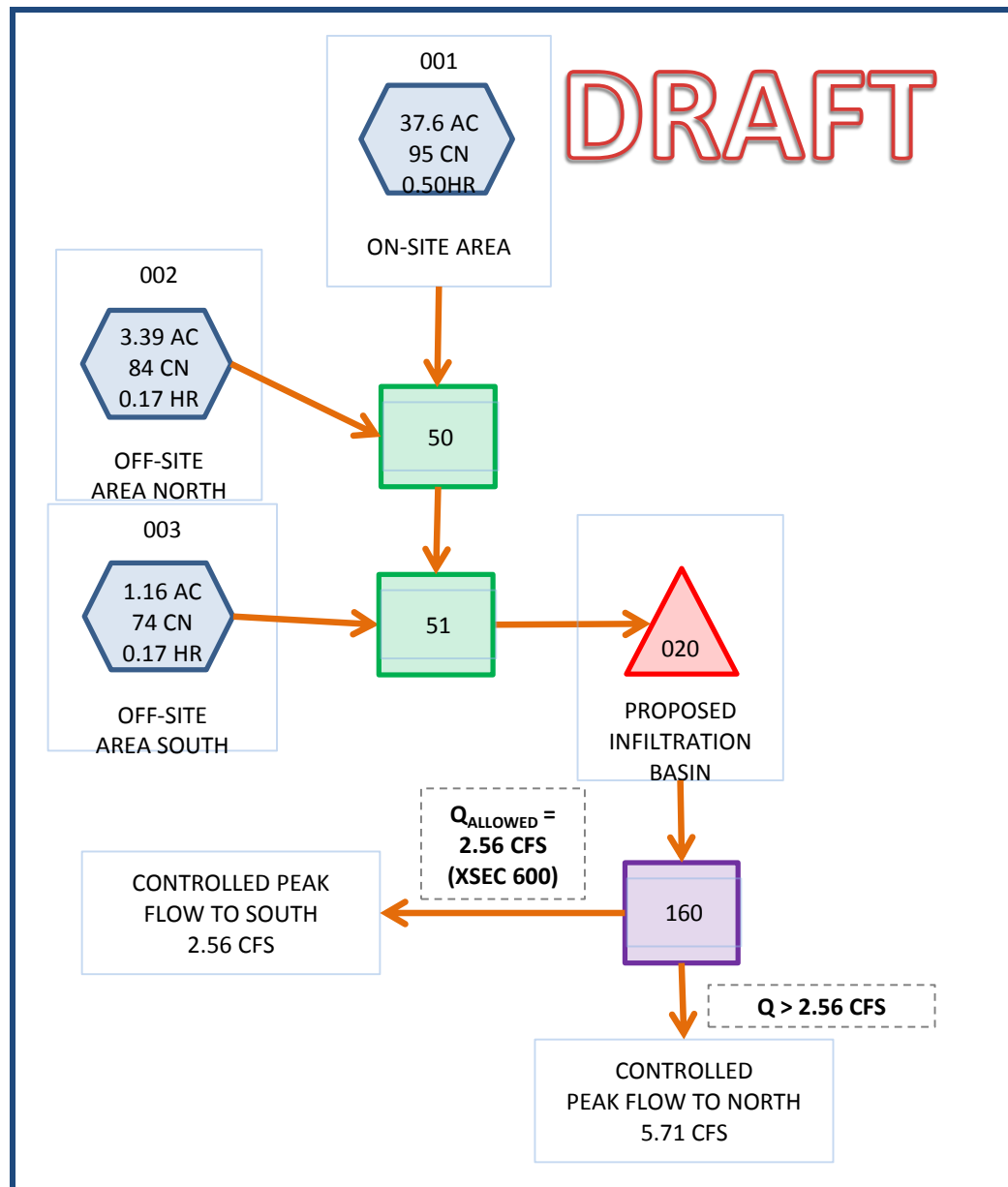
- A. Existing Conditions SWMM Model Network Node-Link Map
- B. Ultimate Conditions SWMM Model Network Node-Link Map

\* \* \* \* \*



|               |           |
|---------------|-----------|
| PROJECT #:    | 8067      |
| DATE:         | 3/20/2015 |
| LAST REVISED: |           |

**SITE CONDITION:** PROPOSED CONDITIONS





9575 W. Higgins Road, Suite 700, Rosemont, Illinois 60018  
Phone: (847) 696-4060 Fax: (847) 696-4065

CONSULTING ENGINEERS  
SITE DEVELOPMENT ENGINEERS  
LAND SURVEYORS

PROJECT: LEWIS AIRPORT BUILDING  
LOCATION: ROMEOVILLE, IL

PROJECT #: 8067  
DATE: 3/20/2015  
LAST REVISED:

CALCULATION TITLE: PROPOSED OVERALLL RATING CURVE  
DESCRIPTION: SEE PRELIMINARY ENGINEERING PLANS  
SITE CONDITION: PROPOSED

| DESCRIPTION  | ELEV<br>FT | FLOWS      |           |           |       | VOLUMES |       |       |         |       |        |
|--------------|------------|------------|-----------|-----------|-------|---------|-------|-------|---------|-------|--------|
|              |            | INFILTRATE | NORTH OCS | SOUTH OCS | TOTAL | PIPE    | STONE | BASIN | SURFACE | TOTAL | ΣTOTAL |
| BOTTOM STONE | 621.00     | 0.00       | 0.00      | 0.00      | 0.00  | 0.00    | 0.00  | 0.00  | 0.00    | 0.00  | 0.00   |
| OUTLET       | 621.35     | 1.68       | 0.00      | 0.00      | 1.68  | 0.00    | 0.41  | 0.00  | 0.00    | 0.41  | 0.41   |
|              | 622.00     | 1.76       | 0.38      | 0.00      | 2.15  | 0.00    | 0.78  | 0.00  | 0.00    | 0.78  | 1.18   |
| TOP STONE    | 623.00     | 1.88       | 0.68      | 0.00      | 2.56  | 0.13    | 1.26  | 0.00  | 0.00    | 1.40  | 2.58   |
|              | 624.00     | 2.00       | 0.89      | 0.00      | 2.88  | 0.13    | 0.00  | 3.84  | 0.00    | 3.97  | 6.55   |
|              | 625.00     | 2.11       | 1.05      | 0.68      | 3.84  | 0.13    | 0.00  | 4.07  | 0.00    | 4.20  | 10.76  |
|              | 626.00     | 2.23       | 2.93      | 1.90      | 7.06  | 0.13    | 0.00  | 4.31  | 0.00    | 4.44  | 15.19  |
|              | 626.50     | 2.29       | 3.60      | 2.29      | 8.18  | 0.00    | 0.00  | 2.24  | 0.37    | 2.61  | 17.80  |
| HWL          | 626.90     | 2.35       | 4.03      | 2.56      | 8.94  | 0.00    | 0.00  | 1.84  | 1.61    | 3.45  | 21.26  |

DRAFT



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1420 Kensington Road, Suite 103  
Oak Brook, IL  
TELEPHONE (630)  
FAX (630) 203 3341

|               |                                            |      |           |
|---------------|--------------------------------------------|------|-----------|
| JOB           | Spangler Analysis with Panattoni Site      |      |           |
| SHEET NO.     | Attachment 2: Detention Calc Conversion    |      |           |
| CALCULATED BY | RM                                         | DATE | 4/16/2015 |
| CHECKED BY    | MRB                                        | DATE | 4/16/2015 |
| SCALE         |                                            |      |           |
| DESCRIPTION   | Stage Storage - Spangler Parcel            |      |           |
|               | Detention conversion for SWMM (stage-area) |      |           |

| SURFACE<br>ELEVATION<br>ft. | INCREMENTAL<br>ELEVATION<br>ft. | SURFACE<br>AREA<br>sq. ft. | INCREMENTAL<br>VOLUME<br>ft^3 | INCREMENTAL<br>VOLUME<br>ac-ft | CUMM<br>VOLUME<br>ac-ft | Target<br>VOLUME<br>ac-ft |
|-----------------------------|---------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------|---------------------------|
| 621.00                      | 0.00                            | 50,000                     | 0                             | 0.00                           | 0.00                    | 0                         |
| 621.35                      | 0.35                            | 51,000                     | 17,675                        | 0.41                           | 0.41                    | 0.41                      |
| 622.00                      | 0.65                            | 52,500                     | 33,636                        | 0.77                           | 1.18                    | 1.18                      |
| 623.00                      | 1.00                            | 70,000                     | 61,041                        | 1.40                           | 2.58                    | 2.58                      |
| 623.01                      | 0.01                            | 167,000                    | 1,150                         | 0.03                           | 2.61                    |                           |
| 624.00                      | 0.99                            | 180,000                    | 171,725                       | 3.94                           | 6.55                    | 6.55                      |
| 625.00                      | 1.00                            | 187,000                    | 183,489                       | 4.21                           | 10.76                   | 10.76                     |
| 626.00                      | 1.00                            | 199,000                    | 192,969                       | 4.43                           | 15.19                   | 15.19                     |
| 626.50                      | 0.50                            | 257,000                    | 113,691                       | 2.61                           | 17.80                   | 17.80                     |
| 626.90                      | 0.40                            | 280,000                    | 107,367                       | 2.46                           | 20.26                   | 21.26                     |

Note: Data provided by Jacob & Hefner and Spaceco

| DESCRIPTION  | ELEV<br>FT | FLOWS      |           |           |       | VOLUMES |       |       |         |       |
|--------------|------------|------------|-----------|-----------|-------|---------|-------|-------|---------|-------|
|              |            | INFILTRATE | NORTH OCS | SOUTH OCS | TOTAL | PIPE    | STONE | BASIN | SURFACE | TOTAL |
| BOTTOM STONE | 621.00     | 0.00       | 0.00      | 0.00      | 0.00  | 0.00    | 0.00  | 0.00  | 0.00    | 0.00  |
| OUTLET       | 621.35     | 1.68       | 0.00      | 0.00      | 1.68  | 0.00    | 0.41  | 0.00  | 0.00    | 0.41  |
|              | 622.00     | 1.76       | 0.38      | 0.00      | 2.15  | 0.00    | 0.78  | 0.00  | 0.00    | 0.78  |
| TOP STONE    | 623.00     | 1.88       | 0.68      | 0.00      | 2.56  | 0.13    | 1.26  | 0.00  | 0.00    | 1.40  |
|              | 624.00     | 2.00       | 0.89      | 0.00      | 2.88  | 0.13    | 0.00  | 3.84  | 0.00    | 3.97  |
|              | 625.00     | 2.11       | 1.05      | 0.68      | 3.84  | 0.13    | 0.00  | 4.07  | 0.00    | 4.20  |
|              | 626.00     | 2.23       | 2.93      | 1.90      | 7.06  | 0.13    | 0.00  | 4.31  | 0.00    | 4.44  |
|              | 626.50     | 2.29       | 3.60      | 2.29      | 8.18  | 0.00    | 0.00  | 2.24  | 0.37    | 2.61  |
| HWL          | 626.90     | 2.35       | 4.03      | 2.56      | 8.94  | 0.00    | 0.00  | 1.84  | 1.61    | 3.45  |



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1420 Kensington Road, Suite 103  
Oak Brook, IL  
TELEPHONE (630)  
FAX (630) 203 3341

JOB

Spangler Parcel CLOMR with Panattoni

SHEET NO.

|   |    |   |
|---|----|---|
| 1 | OF | 2 |
|---|----|---|

CALCULATED BY

|    |      |           |
|----|------|-----------|
| RM | DATE | 4/23/2015 |
|----|------|-----------|

CHECKED BY

|     |      |           |
|-----|------|-----------|
| MRB | DATE | 4/23/2015 |
|-----|------|-----------|

REVISED BY

|     |      |           |
|-----|------|-----------|
| MRB | DATE | 5/21/2015 |
|-----|------|-----------|

DESCRIPTION

|                                        |
|----------------------------------------|
| Proposed Conditions SWMM Summary Table |
| Peak Elevations                        |

| Node           | 1hr   | 3hr   | 6hr   | 12hr   | 18hr  | 24hr  | 48hr  | 72hr  | Maximum      |
|----------------|-------|-------|-------|--------|-------|-------|-------|-------|--------------|
| J10            | 651.4 | 651.4 | 651.2 | 651.1  | 650.8 | 649.6 | 645.8 | 644.8 | <b>651.4</b> |
| J11            | 644.8 | 644.8 | 644.6 | 644.3  | 644.0 | 643.9 | 643.7 | 643.6 | <b>644.8</b> |
| J12            | 630.0 | 630.2 | 628.5 | 628.4  | 628.8 | 628.9 | 628.9 | 628.5 | <b>630.2</b> |
| J13            | 630.0 | 630.2 | 628.4 | 628.4  | 628.8 | 628.9 | 628.9 | 628.5 | <b>630.2</b> |
| J14            | 625.8 | 626.8 | 627.6 | 628.3  | 628.8 | 628.8 | 628.8 | 628.5 | <b>628.8</b> |
| J20            | 640.2 | 640.2 | 640.2 | 640.2  | 640.1 | 639.3 | 637.7 | 636.9 | <b>640.2</b> |
| J21            | 637.2 | 637.2 | 637.2 | 637.2  | 637.1 | 637.0 | 636.5 | 636.2 | <b>637.2</b> |
| J22            | 625.8 | 626.8 | 627.6 | 628.3  | 628.8 | 628.8 | 628.8 | 628.5 | <b>628.8</b> |
| J23            | 640.5 | 640.5 | 640.5 | 640.5  | 640.3 | 639.5 | 637.7 | 636.7 | <b>640.5</b> |
| J31            | 614.3 | 615.1 | 615.2 | 615.5  | 615.7 | 615.6 | 615.0 | 614.7 | <b>615.7</b> |
| J32            | 612.8 | 613.7 | 613.8 | 613.9  | 614.0 | 614.0 | 613.6 | 613.3 | <b>614.0</b> |
| J40            | 625.7 | 626.8 | 627.5 | 628.2  | 628.6 | 628.7 | 628.7 | 628.4 | <b>628.7</b> |
| J41            | 623.6 | 623.7 | 623.9 | 624.0  | 624.0 | 624.0 | 624.0 | 624.0 | <b>624.0</b> |
| J42            | 622.3 | 622.3 | 622.4 | 622.4  | 622.5 | 622.5 | 622.5 | 622.4 | <b>622.5</b> |
| J60            | 618.0 | 618.0 | 618.0 | 618.5  | 618.6 | 618.6 | 618.4 | 618.0 | <b>618.6</b> |
| J61            | 616.5 | 616.7 | 616.7 | 616.9  | 616.9 | 616.9 | 616.8 | 616.7 | <b>616.9</b> |
| J62            | 614.7 | 615.6 | 615.7 | 615.9  | 616.1 | 616.0 | 615.5 | 615.2 | <b>616.1</b> |
| J63            | 617.0 | 617.2 | 617.3 | 617.4  | 617.4 | 617.4 | 617.3 | 617.3 | <b>617.4</b> |
| J64            | 618.6 | 619.5 | 619.9 | 620.2  | 620.3 | 620.3 | 620.1 | 619.8 | <b>620.3</b> |
| O1             | 612.1 | 612.6 | 612.7 | 612.7  | 612.8 | 612.8 | 612.6 | 612.4 | <b>612.8</b> |
| O2             | 619.0 | 619.0 | 619.0 | 619.0  | 619.0 | 619.0 | 619.0 | 619.0 | <b>619.0</b> |
| Pond1          | 625.8 | 626.8 | 627.6 | 628.3  | 628.8 | 628.8 | 628.8 | 628.5 | <b>628.8</b> |
| Pond2          | 614.5 | 615.4 | 615.6 | 615.8  | 616.0 | 615.9 | 615.3 | 615.0 | <b>616.0</b> |
| FedExPond      | 651.6 | 651.6 | 651.5 | 651.30 | 651.0 | 649.8 | 648.6 | 648.4 | <b>651.6</b> |
| PactivPond     | 640.5 | 640.5 | 640.5 | 640.50 | 640.3 | 639.5 | 637.7 | 636.9 | <b>640.5</b> |
| PannottiniPond | 624.6 | 625.5 | 626.0 | 626.33 | 626.5 | 626.5 | 626.2 | 625.9 | <b>626.5</b> |
| PondNE         | 618.8 | 619.6 | 620.0 | 620.35 | 620.5 | 620.5 | 620.3 | 620.0 | <b>620.5</b> |
| PondNW         | 618.8 | 619.6 | 620.0 | 620.36 | 620.5 | 620.5 | 620.3 | 620.0 | <b>620.5</b> |



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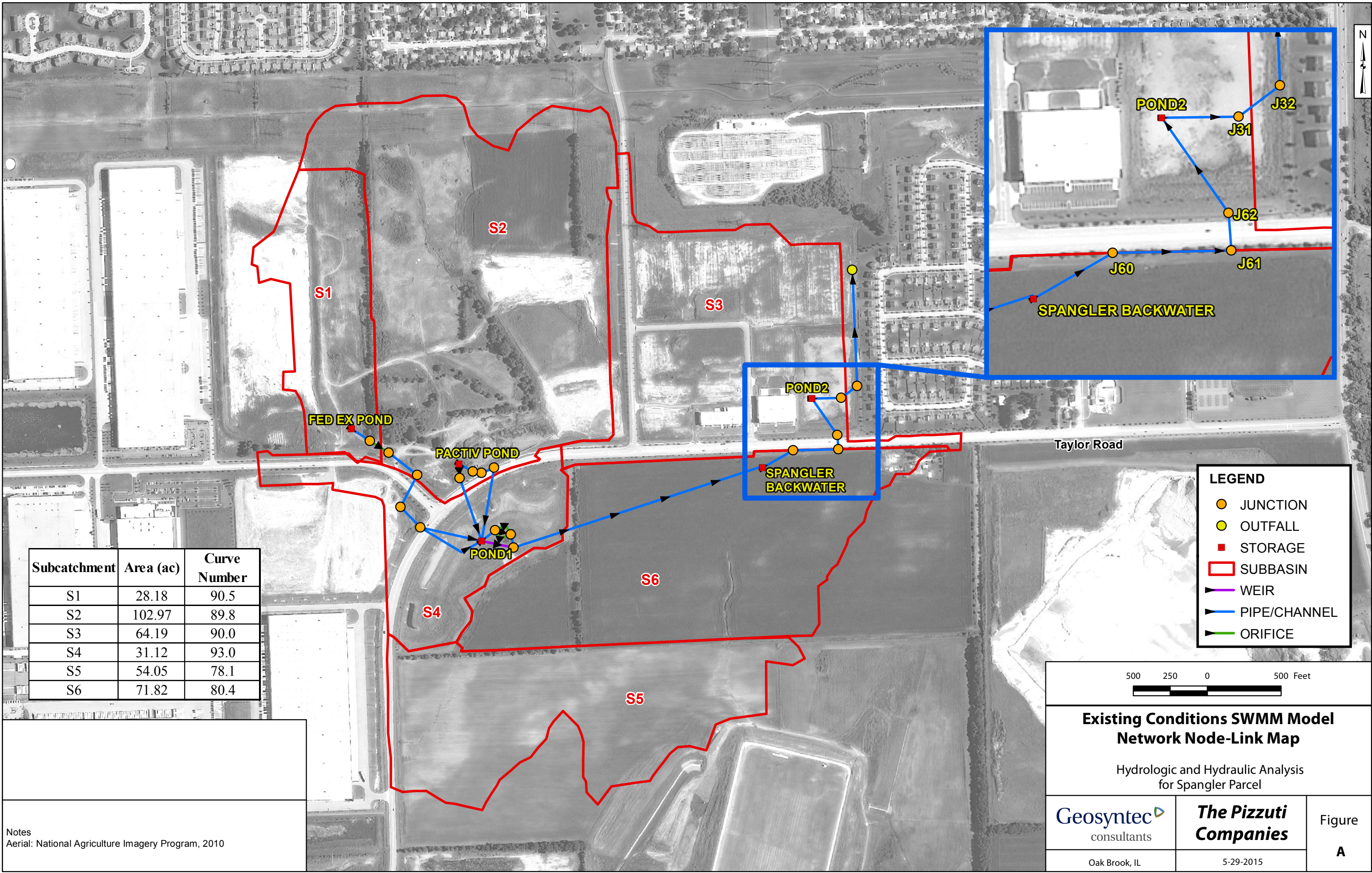
1420 Kensington Road, Suite 103  
Oak Brook, IL  
TELEPHONE (630)  
FAX (630) 203 3341

|               |                                        |      |           |
|---------------|----------------------------------------|------|-----------|
| JOB           | Spangler Parcel CLOMR with Panattoni   |      |           |
| SHEET NO.     | 2                                      | OF   | 2         |
| CALCULATED BY | RM                                     | DATE | 4/23/2015 |
| CHECKED BY    | MRB                                    | DATE | 4/23/2015 |
| REVISED BY    | MRB                                    | DATE | 5/21/2015 |
| DESCRIPTION   | Proposed Conditions SWMM Summary Table |      |           |
|               | Peak Flows (CFS)                       |      |           |

| Link | 1hr  | 3hr  | 6hr  | 12hr | 18hr | 24hr | 48hr | 72hr | Maximum     |
|------|------|------|------|------|------|------|------|------|-------------|
| C10  | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 | 21.1 | 13.0 | 9.5  | <b>23.0</b> |
| C11  | 51.6 | 52.2 | 43.2 | 33.9 | 23.4 | 21.1 | 13.0 | 9.5  | <b>52.2</b> |
| C12  | 50.7 | 51.5 | 42.8 | 33.9 | 23.3 | 21.0 | 12.9 | 9.5  | <b>51.5</b> |
| C13  | 50.3 | 51.2 | 42.7 | 33.8 | 23.1 | 20.8 | 12.8 | 9.4  | <b>51.2</b> |
| C14  | 25.1 | 25.6 | 21.3 | 16.7 | 11.5 | 10.3 | 6.4  | 4.7  | <b>25.6</b> |
| C15  | 25.1 | 25.6 | 21.3 | 16.7 | 11.5 | 10.3 | 6.4  | 4.7  | <b>25.6</b> |
| C20  | 51.1 | 51.1 | 51.1 | 51.1 | 50.0 | 43.8 | 22.1 | 11.2 | <b>51.1</b> |
| C21  | 51.1 | 51.1 | 51.1 | 51.1 | 50.0 | 43.8 | 22.1 | 11.2 | <b>51.1</b> |
| C22  | 51.1 | 51.1 | 51.1 | 51.1 | 49.9 | 43.7 | 22.0 | 11.2 | <b>51.1</b> |
| C23  | 26.5 | 26.5 | 26.5 | 26.5 | 26.3 | 25.4 | 23.3 | 22.4 | <b>26.5</b> |
| C26  | 42.7 | 64.4 | 66.4 | 70.6 | 73.3 | 71.5 | 62.5 | 54.7 | <b>73.3</b> |
| C31  | 42.7 | 64.4 | 66.4 | 70.6 | 73.3 | 71.5 | 62.5 | 54.7 | <b>73.3</b> |
| C33  | 42.7 | 64.4 | 66.4 | 70.6 | 73.3 | 71.5 | 62.5 | 54.7 | <b>73.3</b> |
| C40  | 9.3  | 14.1 | 19.6 | 23.3 | 25.2 | 25.4 | 25.3 | 23.9 | <b>25.4</b> |
| C41  | 9.3  | 14.1 | 19.6 | 23.3 | 25.2 | 25.4 | 25.3 | 23.9 | <b>25.4</b> |
| C60  | 9.3  | 14.1 | 19.6 | 23.3 | 25.2 | 25.4 | 25.3 | 23.9 | <b>25.4</b> |
| C61  | 47.9 | 45.5 | 36.0 | 41.6 | 44.9 | 43.9 | 40.9 | 37.1 | <b>47.9</b> |
| C62  | 0.0  | 0.0  | 0.0  | 6.3  | 9.8  | 9.0  | 4.6  | 0.0  | <b>9.8</b>  |
| C63  | 29.9 | 38.1 | 41.1 | 49.1 | 53.3 | 52.3 | 47.3 | 41.2 | <b>53.3</b> |
| C64  | 29.9 | 38.2 | 41.2 | 49.1 | 53.3 | 52.3 | 47.3 | 41.2 | <b>53.3</b> |
| C65  | 29.9 | 38.1 | 41.1 | 42.9 | 43.4 | 43.3 | 42.7 | 41.2 | <b>43.4</b> |
| C66  | 29.9 | 38.1 | 41.1 | 42.9 | 43.4 | 43.3 | 42.7 | 41.2 | <b>43.4</b> |

\* Pond 2 Outfall

\*\* Taylor Road Culvert



| Subcatchment | Area (ac) | Curve Number |
|--------------|-----------|--------------|
| S1           | 28.18     | 90.5         |
| S2           | 102.97    | 89.8         |
| S3           | 64.19     | 90.0         |
| S4           | 31.12     | 93.0         |
| S5           | 54.05     | 78.1         |
| S6           | 71.82     | 80.4         |

Notes  
Aerial: National Agriculture Imagery Program, 2010

