# Memorandum

**TO:**     Mayor Marlin and City Council Members
**FROM:**   Melissa Haynes, Crime Analyst
**RE:**     IDOT and Crime Mapping Update
**DATE:**   May 18, 2017

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I would like to provide an update to Council on the crime mapping software installation, which is a vital component to being able to analyze and provide valuable information regarding IDOT data. I am hopeful that despite the below described difficulties I will be able to provide the analysis of the first two quarters of 2017 of IDOT data in July including a mapping component, as I indicated at the Committee of the Whole meeting in March.

Please see the below table for a timeline of tasks completed in installing and configuring the newly purchased ArcGIS, Spatial Analyst Extension, and Bradshaw Consulting Services (BCS) Crime Analysis Tools. There have been some typical technical delays: for example, during configuration, there was an issue with permissions and authorizations for the program to be able to write to the computer. This was fixed and the second configuration was successful. The largest issue we are currently facing is with "dirty data" and the process of cleaning the non-standardized addresses.

| Task | Completion date |
|------|-----------------|
| **Received contract from BCS** | February 21, 2017 |
| **Contract reviewed by Legal Department** | March 6, 2017 |
| **Contract reviewed by BCS** | March 9, 2017 |
| **Contract signed** | March 14, 2017 |
| **Competitive Purchase Form completed** | March 20, 2017 |
| **Initial UPD data queries completed** | March 30, 2017 |
| **Program installation** | Week of April 3, 2017 |
| **Queries edited to meet software requirements** | April 12, 2017 |
| **First address cleaning completed** | April 21, 2017 |
| **First configuration, first attempt at geocoding** | April 24, 2017 |
| **Second address cleaning completed** | April 27, 2017 |
| **Second configuration, second geocoding attempt** | May 1, 2017 |
| **Third address cleaning completed** | May 10, 2017 |
| **Third geocoding attempt** | May 12, 2017 |
| **Fourth address cleaning completed** | May 16, 2017 |
| **Fourth geocoding attempt** | May 17, 2017 |

A mapping analysis of data starts with geocoding, which is assigning a coordinate location to an address, so that it can be mapped.  The basemap that we use for geocoding is maintained by the Champaign County Geographic Information Systems (GIS) Consortium, and follows addressing standards similar to those used by the Post Office, with components of the address broken into separate pieces of information.  However, our problems are that the address fields in ARMS are not standardized; they are entered as one line of text, and therefore, there are several inconsistencies that are problematic.  For example, 400 S Vine St could be entered as 400 Vine St S, 400 Vine, 400 Vine St, etc.  This becomes an issue when the basemap is looking for "400 S Vine St".  It's even more of an issue when addresses could be mapped to either street direction (N Vine or S Vine, E University or W University) but the ARMS data does not specify.  Unfortunately, traffic stops are the most problematic, as the ticket indicates cross streets and not addresses.  When cross streets have historically been entered into ARMS, they have not included street direction, leading to a large portion of traffic stops with lower than acceptable address matching scores.

I have worked extensively with the GIS Analyst from BCS, Urbana's Information Technology (IT) Department and the GIS Consortium to attempt to map the address fields using several tools.  The GIS Consortium provided guidance on the structure of addresses as well as the programmatic side of the GIS Consortium geolocator functionality, which led the BCS GIS Analyst to build a geolocator specifically for UPD.  The IT Department has written data transformations to restructure the freeform address field to attempt to standardize, at a minimum, the street direction, cross-street format, and apartment number.

For future data to be easier to map, I have talked to the PSR Coordinator about consistent address entry, and some changes will be made to the entry guidance (for example, entering directions on cross streets).  However, the biggest improvement will be to change ARMS to standardize data entry fields.  This change has been raised with the ARMS User Group (request #476), but was ranked 15th on the list of changes by the ARMS User Group in October 2016 – and so will not be accomplished any time in the next 6 months, at least.  Even after this change is made, it would only impact future data entry, and would not cleanse any of the existing ARMS records.

I am continuing to work through the issues as they arise, and hope to present to the Committee of the Whole on July 24th.  In the interim, please email me if you have any questions at crimeanalysis@urbanaillinois.us.