



MEMORANDUM

TO: North Central Texas Council of Governments
iSWM Implementation Subcommittee

DATE: January 12, 2022

FROM: Ben Pylant Cooper Hoffman Mikel Wilkins
Halff Associates TBG Partners

EMAIL: bpylant@halff.com choffman@halff.com mikel.wilkins@tbgpartners.com

SUBJECT: Hydrologic Mimicry and iSWM

Hydrologic mimicry in its truest sense sets planning and design goals to restore true pre-development hydrologic conditions in both greenfield and greyfield scenarios. Planning and design to achieve these goals generally requires more intensive measures in greenfield scenarios where the land has been altered for agricultural purposes.

While agricultural land has typically been considered ‘undeveloped’ it does not truly represent pre-developed conditions as topography, vegetation, and soil conditions have been significantly altered from natural conditions. Consequently, the water balance of agriculturally modified greenfields is significantly different than the water balance for pre-developed native conditions. Generally, the stormwater runoff volumes from agriculturally modified greenfields are higher than for pre-developed native conditions due to altered topography, loss of native vegetation, loss of topsoil, and modification of underlying soil characteristics. The same scenario generally applies for greyfield sites where native conditions were likely modified significantly prior to the construction of the existing developments.

The iSWM Criteria and Technical manuals do not provide guidance for planning and design for hydrologic mimicry. They do provide guidance for restorative approaches to preserve, conserve, and restore natural systems to improve hydrologic conditions within both greenfield and greyfield sites. The most relevant guidance for restorative planning and design practices are listed below:

iSWM Criteria Manual with TriSWM Appendix (2015)

- Section 2.2: Steps in the Development Process (Page 9)
 - Step 2 – Collect Data and Perform Site Analysis: Provides a list of site features that should be inventoried prior to initiation of site design including features such as wetlands, critical habitat areas, ground cover and vegetation. We recommend expanding this section to include references to publicly available data that planners and designers can reference beyond what may be provided by the specific municipality.
 - Step 3 – Prepare Conceptual/Preliminary Site Plans: The conceptual/preliminary site plans should be developed based on findings from the site analysis and clearly indicate efforts to; preserve natural feature conservation areas, fit the development to the terrain and minimize land disturbance, reduce impervious surface area, and preserving and utilizing natural drainage systems wherever possible. Expanding guidance for Step 2 should facilitate and improve the development of conceptual and preliminary site plans with more restorative outcomes.



iSWM Technical Manual (2021)

- Planning Document – Section 2.2: *integrated* Site Design Practices
 - 2.2.1 Conservation of Natural Features and Resources (PL-12): Details five integrated site design practices.
 - 2.2.2 Lower Impact Site Design Practices (PL-20): Details eleven integrated site design practices.
 - 2.2.4 Utilization of Natural Features for Stormwater Management (PL-37): Details four integrated site design practices.
 - Connecting these site design resources to an expanded set of resources for planners and designers suggested for Section 2.2 of the Criteria Manual is recommended.
- Hydrology Document – Section 1.0 Hydrological Analysis
 - Table 1.6 – Recommended Runoff Coefficient Values (HO-11): Provides limited guidance on runoff coefficients for ‘pre-development’ conditions including only lawns, agricultural, and forest.
 - Table 1.9 – Runoff Curve Numbers (HO-20): Provides more expansive SCS data for ‘pre-development’ land cover conditions.

Recommendations

Hydrologic mimicry is not specifically referenced in iSWM guidance but the foundational concepts of it are discussed in both the Criteria and Technical Manuals. It is important to note that preliminary site plans for all scales of development are commonly prepared by planners and designers that are generally not referencing iSWM guidance. iSWM guidance is used more by the engineering community as a technical resource and often after conceptual site plans have been completed.

Expanding guidance and providing additional references to helpful resources within Section 2.2 (Steps in the Development Process) of the iSWM Criteria Manual is recommended. Building on expanded guidance and the creation of an outreach and education program targeted to the development community, planners and landscape architects would be beneficial. Focusing on planners and designers that haven’t traditionally referenced iSWM guidance in the early phases of development planning will ultimately facilitate the implementation of *integrated* Site Design Practices detailed in the iSWM Technical Manual.

Consideration of providing more detailed guidance in Section 1.0 Hydrological Analysis, specifically by expanding upon the recommended runoff coefficient values in Table 1.6 is also recommended. This would allow for more accurate calculations of ‘pre-development’ and ‘post-development’ hydrology. Using the rational method has traditionally been considered a less time intensive approach but it provides limited options and generally provides less accurate results than the more detailed SCS approach. Building in guidance on the use of both approaches as part of an outreach and education program targeted to early phase planners and designers while also expanding options for more detailed and accurate calculations for engineers is also recommended.