Phase I NPDES Municipal Stormwater Permittees Proposal - LID Feasibility Guidance

Introduction

Low Impact Development (LID) Feasibility is a hard topic to wrap your mind around for two reasons: (1) the concept of LID is broad and means different things to different people; (2) there are so many different factors to consider about a particular development when considering feasibility. The concept of this paper and matrix is to break the complex problem down to manageable individual evaluations by giving a qualitative rating of the feasibility of LID techniques over a variety of site conditions and considerations. Then all those evaluations can be viewed together to find trends of LID feasibility.

Even when the LID feasibility evaluation is broken down to individual techniques used at specific site conditions, the evaluation can still be somewhat subjective to the rater. Therefore, multiple Phase 1 NPDES jurisdictions independently scored each technique and the scores were then averaged. With this methodology it was hoped that the final matrix scores would capture any opposing views by resulting in more "uncertain" determination for a particular use.

- *LID Matrix layout*

A variety of LID techniques are listed across the top of the spreadsheet. They are grouped into general benefit categories however anyone who is familiar with these techniques quickly realizes there is overlap to the benefits and the groupings don't quite perfectly capture each technique. These techniques are then compared with site conditions and other considerations listed along the left hand column. Not every site condition was listed but only the conditions that were considered to be the most common or challenging. No attempt is made in the matrix to define terms, specific techniques, site conditions or considerations, or to explain their interactions, but those would be necessary next steps toward framing any development regulation. Most entries relate to technical feasibility, which is just part of the physical, practical, and reasonable financial and environmental considerations for feasibility of LID.

The jurisdictions then scored the LID techniques on a scale of 1 to 5 giving a 1 where the technique is considered highly feasible and a 5 where the technique raises some strong reservations of adverse consequences. Independent scores from each jurisdiction were then averaged and color coded for a visual representation of feasibility. Dark green represents the most feasible and darker red represents strong reservations. There are some cells labeled N/A where the particular LID technique really doesn't apply.

- *Yellow Means More Experience Needed*

The low hanging fruit of this analysis were either the techniques that were determined to be infeasible or the techniques that most staff considered very feasible. But there are still many techniques that fall somewhere in between and

were given a rating closer to "uncertain". These techniques may or may not be feasible but more research or possibly more parameters put on their use might aide in determining their feasibility.

- *Consider Limiting Factors for an LID Technique*

Often the use of any stormwater technique depends on multiple conditions being optimal. Therefore for each use of an LID technique all the conditions must be evaluated to determine whether there is a limiting factor making the application infeasible. For example, the use of porous pavement might be feasible for a collector road with porous soils but if groundwater is too shallow it still might be infeasible. The matrix identifies many of the site conditions or factors which are most limiting for each individual circumstance.
These factors are to get a general concept of what may be feasible, but are unable to reflect the scale at which the technique is feasible on a site-specific basis – for example: is bioretention on a moderate slope feasible for only a driveway drainage area or is it feasible for larger areas? Additional feasibility not addressed includes competing demands for space as well as the variety of setback requirements frequently placed upon a site. The social and economic feasibility of how far to push the space requirements for LID goals over other goals such as space for other uses, pedestrian and vehicular mobility, or housing unit demands, will likely need to be determined on a case by case basis.

- *Just Because a technique is uncommon doesn't make it infeasible*

When developing this matrix some LID techniques seemed highly unlikely for specific land use scenarios. An example would be collector roads, which are often found in urban areas, typically have curb, gutter, and sidewalks. Curb and gutters makes techniques such as dispersion or compost shoulder treatment highly unlikely. However, there are situations where a collector doesn't require curb and gutter and then those techniques are then entirely feasible. Therefore just because a technique is uncommon for a particular land use it does automatically make it infeasible.

- *Feasibility somewhat depends on who you ask*

Even within a jurisdiction there is considerable disagreement on how feasible some techniques are. Most of the staff filling out the matrix were in the field of stormwater and appear to have a more favorable view LID feasibility than say staff in the roads or permitting groups. Some of this depends on your point of view towards trying techniques. If you are conservative and very adverse towards risk then your rating probably reflect less feasibility until the technique is proven by others to be "tried and true".

- *Effectiveness of the techniques*

How effective is a technique is an even more difficult to evaluate than the feasibility issues. For the qualitative evaluation done here there is some sense if a technique is effective for a particular situation. But a reliable effectiveness evaluation needs to have a more quantitative analysis performed. Supposedly

with the more use of LID techniques there will be more opportunities to gather data for a quantitative analysis.
Additionally, the user of the matrix needs to understand that the potentially feasible LID tool or suite of tools may not be able to fully achieve the site's flow control performance standard. For example for larger sites in highly urban land use densities it is likely that the LID suite will need to be supplemented with traditional stormwater management technologies.

Conclusion

Overall the matrix shows that many of the LID techniques are generally feasible for use in a variety of site conditions. There are only a few conditions and/or land uses that raise nearly unanimous apprehension that the use of LID techniques could have serious negative consequences. It appears that some LID is generally feasible on any site, and it is our recommendation that site developers should be required to evaluate using LID for any situations that do not have a red box. Additional steps are needed to determine how the various jurisdictions can review and act upon a given applicant's interpretation of feasibility, and what definitions, regulatory structure and language are needed to help the jurisdiction regulate development.

Note: Port of Seattle submitted a matrix adding in several special scenarios that are unique to near waterway "port" situations. Most of these weren't included into the overall matrix however, contaminate soils condition was included because it is a scenario that other jurisdictions are likely to run into.