



# LOW IMPACT DEVELOPMENT IN SUPPORT OF FORT STEWART ARMY FACILITY

## The LID approach includes five

1. encourage conservation measures;
2. promote impact minimization techniques such as impervious surface reduction;
3. provide for strategic runoff timing by slowing flow using the landscape;
4. use an array of integrated management practices to reduce and cleanse runoff; and,
5. advocate pollution prevention measures to reduce the introduction of pollutants to the environment.

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### The LID Concept

Low Impact Development (LID) is an innovative approach that uses concepts aligned with nature to achieve stormwater management goals. Advanced technologies are applied in an effort to better balance growth with conservation, ecosystem protection, public health and general quality of life. The LID approach seeks to mimic pre-development flow patterns by using design techniques that allow for the proper infiltration, filtering, storage, evaporation and detainment of runoff. LID is aimed at addressing stormwater management at the localized level, and avoiding the concept of draining water from large areas to a centralized location. This is achieved with the implementation of landscape features at the lot level. These landscape features are known as Integrated Management Practices (IMPs). These concepts can be applied to urban settings in a variety of applications, including rooftops, streets, parking lots, sidewalks and medians. LID is an economical approach in that it is achieved using less infrastructure and site preparation work. This means less clearing, grading, piping and paving. The minimal infrastructure requirements of the LID approach leads to lower lifetime costs over conventional methods, with the elimination of massive culvert and piping systems that typically require ongoing maintenance and repair to remain effective.

The LID concept provides important stormwater control benefits, such as groundwater recharge and cleaner streams. The implementation of these techniques also results in an increase in green open space, reduction in pavement that can create “heat islands”, improvement in air quality, reduction in thermal stream pollution and improved aesthetics. The LID technologies are aimed at integrating the urban environment into the overall ecosystem, and at maintaining or restoring the hydrological and ecological functions of the watershed.

### LID Applications at Fort Stewart

Antiquated and malfunctioning drainage systems at Fort Stewart have resulted in flooding problems in many areas of the facility. These problems are compounded by the recent growth

of Fort Stewart, with the construction of new buildings and other facilities. The upgrade of stormwater flow systems is an important part of the infrastructure modernization required to keep pace with the expansion and success of the mission at the post. New technologies are now being applied in concert with conventional methods to provide low maintenance alternatives to handling stormwater drainage. These alternatives have an added benefit





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to the environment by working more closely with the natural landscape. This results in more efficient drainage and infiltration, while also improving the aesthetics of the facility.

Fort Stewart is integrating these LID concepts into landscape designs around buildings with the use of various landscaping tools to improve drainage and decrease flooding in localized areas. These concepts are also being applied to drainage systems that include streams and creeks, to improve flow and to provide a more natural environment for aquatic life. Drainage system improvements at Fort Stewart are aimed at eliminating obstructions to flow and improving water quality. Infrastructure improvements and creation of more natural stream corridors are used to accomplish this goal.

### Specific Methods Used at Fort Stewart to Achieve LID Goals

- Use of surface water modeling to simulate stormwater flow and identify remedies.
- Upgrade and replacement of drainage structures (i.e., culverts and piping) to improve positive flow, decrease sedimentation problems and remedy persistent flooding problems.
- Separate impervious areas with vegetated buffers, install permeable pavements and manage runoff in bioretention areas.
- Develop open channels along watercourses to promote growth of aquatic and riparian vegetation that absorb pollutants, thereby improving water quality.
- Perform stream bank stabilization using native vegetation to decrease sediment loads and maintain water quality.
- Wetlands creation to promote natural drainage systems that maintain water quality and aquatic life.

### ORNL's Involvement in LID Applications at Fort Stewart

ORNL, through the Environmental Sciences Division (ESD), is assisting Fort Stewart in achieving LID goals for the post. Using its expertise in environmental and natural resource monitoring and management, ESD is identifying new ways and suitable locations for the application of IMPs to aid Fort Stewart in meeting their LID goals. ESD provides value-added in this area with corporate knowledge in such areas as native vegetation plantings (including riparian applications), wetlands restoration, aquatic resource assessment, monitoring, and modeling (i.e., hydrology, water quality, macroinvertebrates and fish), toxicity studies, and wildlife management.