

Planning and Site Design of Sustainable Low Impact Development Projects

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Project Site Evaluation and Analysis

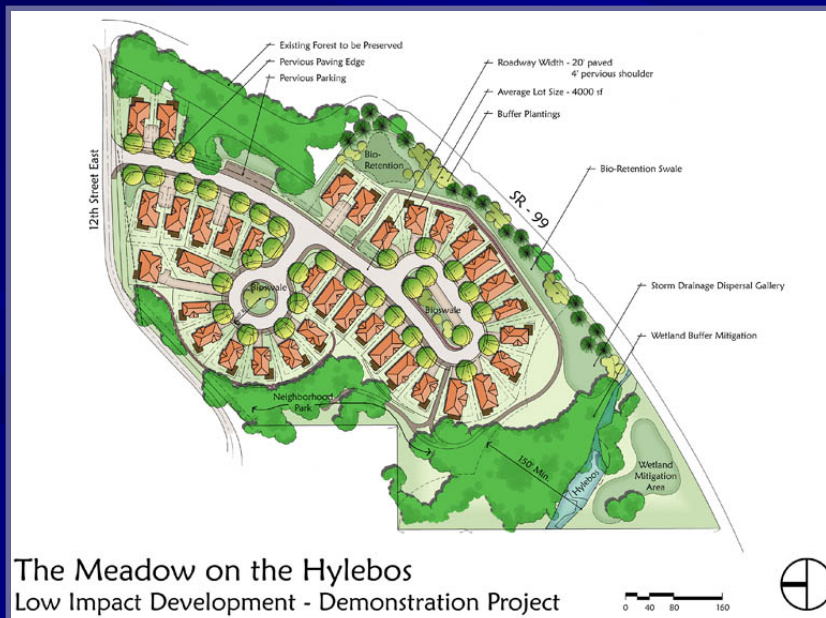
Evaluate site to determine development opportunities and site environmental constraints

- Identify natural resources, and topographic and soil constraints
- Fit the development to the site
- Establish forest/open space retention areas and impervious surface limits (65/10, 75/5, 50/20)
- Maintain and re-use top soil, woody debris and other vegetation

Conduct a Site Inventory

Identify natural resource protection areas onsite

- Forest retention (tree conservation areas)
- Salmon spawning and rearing, and wildlife habitat
- Streams, wetlands, and groundwater recharge areas
- Steep slopes and other critical areas



The Meadow on the Hylebos
Low Impact Development - Demonstration Project

Site Design Process

Site Considerations for Development

- Identify forest retention and open space protection areas
- Orient developed areas to minimize site disturbance
- Eliminate or reduce number of stream crossings

Site Design Process (cont'd)

- Minimize impervious surfaces – reduce building footprints, road length and width where feasible
- Layout roads and lots to follow contours, where feasible
- Direct rooftop runoff to infiltration areas
- Integrate small, dispersed bioretention areas to capture, store, and infiltrate stormwater

Retain Native Vegetation; Re-forest

Retain large, connected tracts of native vegetation

- Use cluster design, or retain forest on individual lots
- Maintain natural hydrologic function
- Provide infiltration areas for overland flows
- Commercial LID – retain 25% native vegetation
- Protect vegetation during and post-construction

Reduce Effective Impervious Surfaces

Reduce EIA associated with roads, sidewalks, driveways and parking areas

- Reduce road width and length; sidewalks on one side of street
- Restrict on-street parking
- Explore alternative paving materials
- Disconnect sidewalks from the traveled roadway
- Design clusters of homes to utilize shared driveways

Reduced Effective Impervious Surfaces



Issaquah Highlands Development

King County 4:1 Project (open space - urban ratio)

- 1400 acres open space
- 500 acres urban (75/20)
- Avoid development in:
 - ✓ Canyon Cr (coho stream)
 - ✓ N. Fork Issaquah wetland #7 (large class 1 wetland)
 - ✓ Steep East

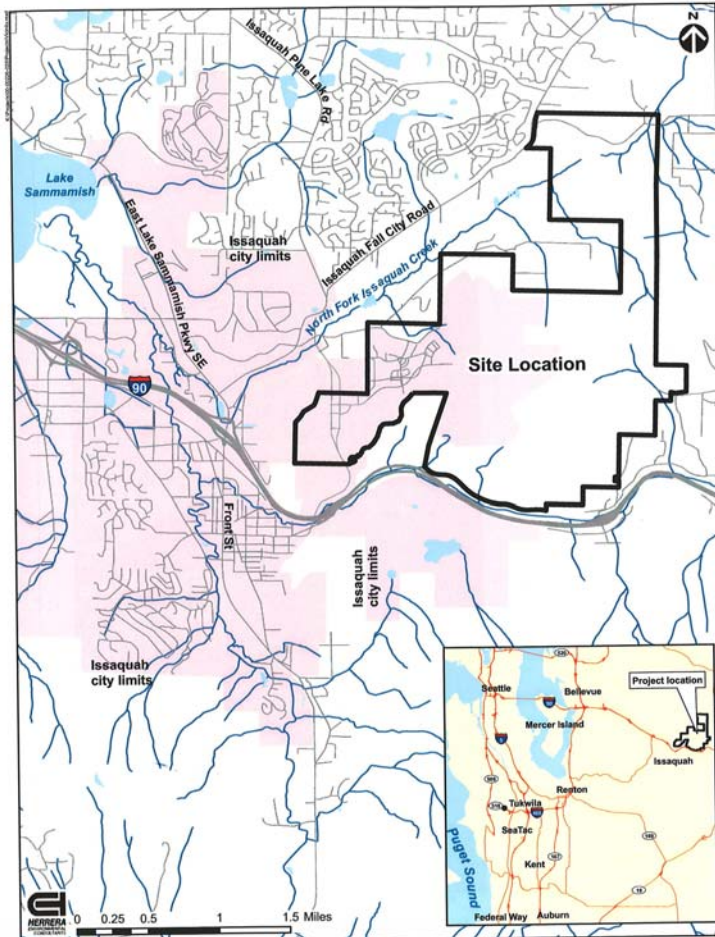
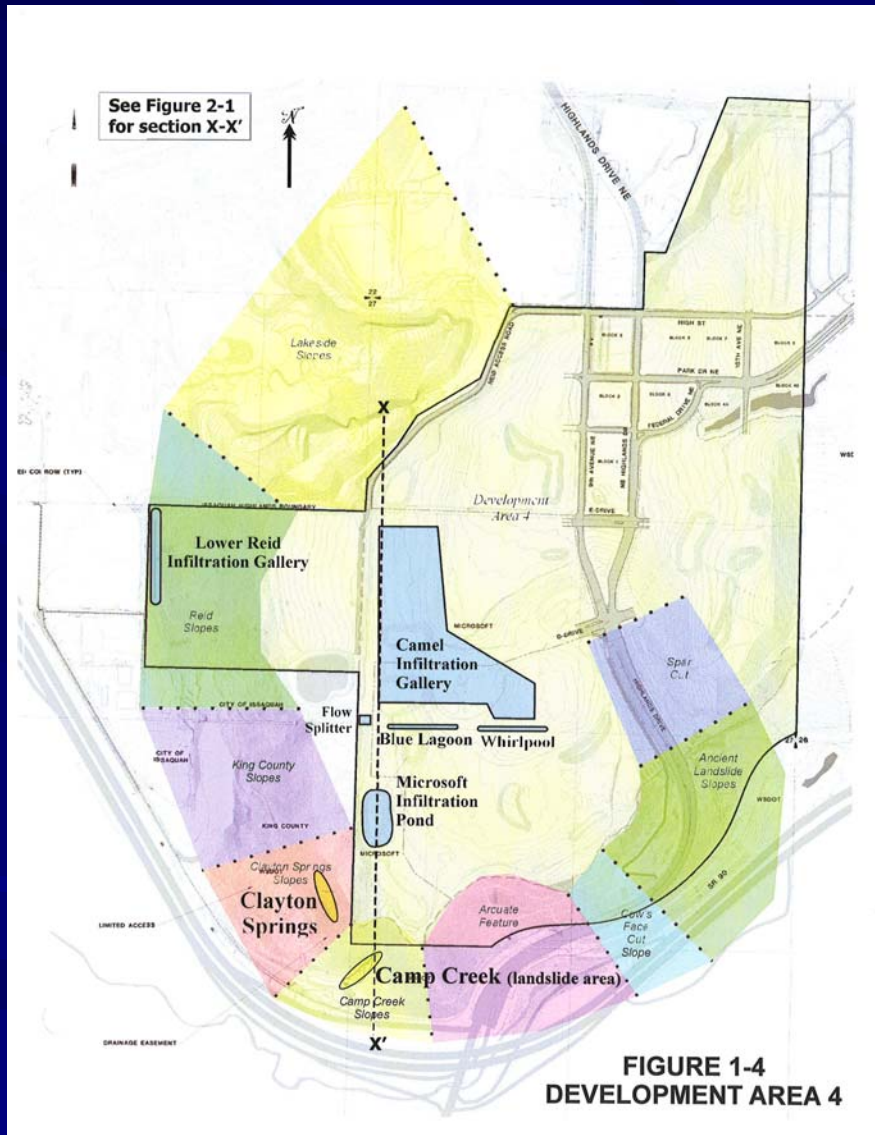


Figure 1. Vicinity and location map of the Issaquah Highlands development, Issaquah, Washington.

Iss. Highlands Stormwater and Infiltration



Stormwater Management and Infiltration:

- Maintain baseflows at pre-development levels
- Prevent increases in flow rates and volumes
- No net loss of recharge to groundwater

Issaquah Highlands Sub-basins



LEGEND

- BUILT-OUT LAND AREA
- PRE-DEVELOPMENT SUBBASINS

DeGross
Photos
Mo

SOURCE: DEGROSS AERIAL MAPPING, INC. PHOTO TAKEN 12-02-06

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FIGURE 2
ISSAQUAH HIGHLANDS BUILT-OUT LAND
AREAS AS OF DECEMBER 2006

SCALE	
SHEET	
DATE	DEC 2006
DWG	
NO.	
REV.	
DATE	

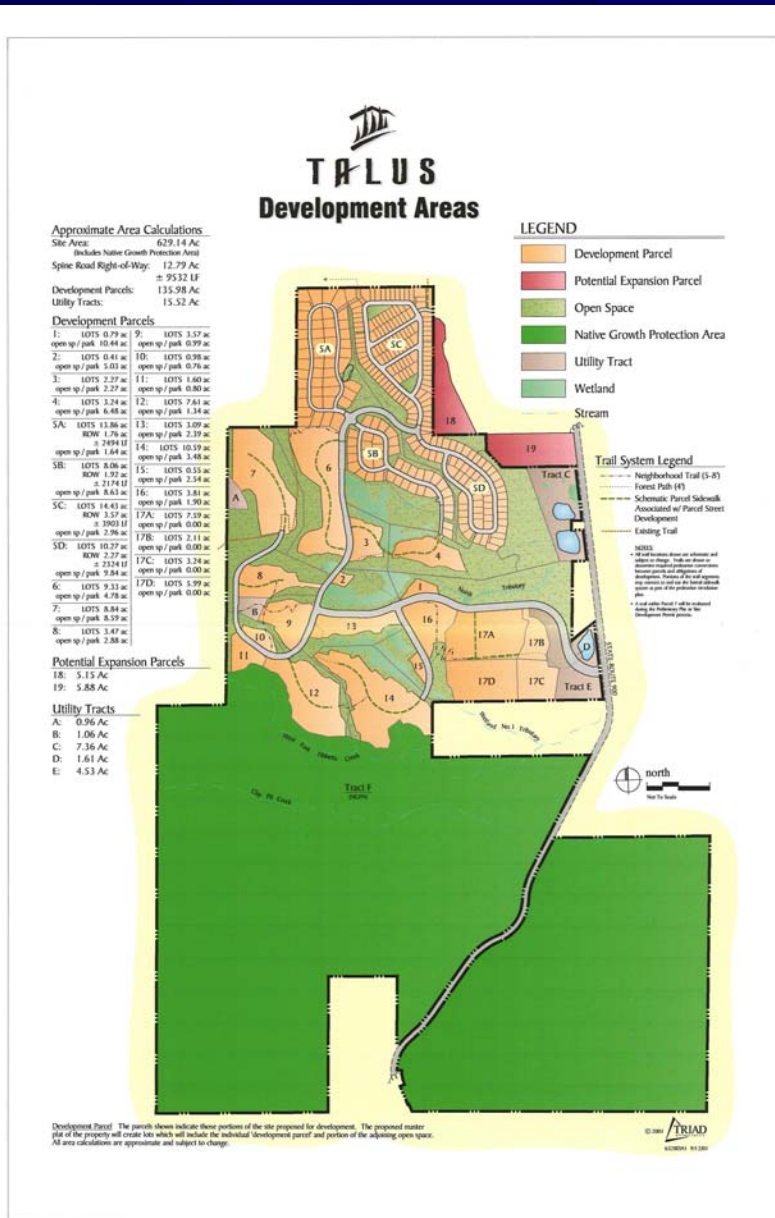
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 Plot Date: 7/1/2007 1:31 PM
 Call User: Todd Prescott

Issaquah Highlands – Other Features

- Houses set closer to street; garages on alleys
- Shared driveways
- Reduced road width; on-street parking on one side only
- Dispersion/infiltration systems for roof runoff
- Infiltration ponds/facilities for developed area runoff
- All topsoil reused onsite; onsite tree debris ground for use as hog fuel during construction

Talus Development - Issaquah

KC/Issaquah 3:1 Project (open space - urban ratio)



- 630 acres total
- 465 acres open space
- 165 acres urban (75/20)
- Avoid development:
 - ✓ South of West Fork Tibbetts Creek
 - ✓ Large onsite wetlands and buffers
 - ✓ Sand filtration to remove

Low Impact Development BMPs

Focus on infiltrating, dispersing, evaporating, in some cases re-using, and as a last resort, detaining and discharging stormwater

- Infiltration and soil amendment
- Bio-retention and rain gardens
- Dispersion of roof runoff (or green roofs)
- Dispersion of road runoff (or permeable pavement)
- Pervious pavement on driveways, parking stalls and sidewalks
- When these LID BMPs are not feasible, utilize more conventional stormwater management techniques

Benefits of LID and Sustainable Projects



Protect aquatic resources:

- wetlands quality and hydro-period changes
- streams and salmon habitat
- Protect groundwater recharge

Benefits of LID and Sustainable Projects



Protect Water Quality:

- Reduce lake eutrophication
- Minimize instream erosion and incision
- Reduce sediments in wetlands

Benefits of LID and Sustainable Projects



Reduce generation of new runoff and downstream flooding:

- Residential flooding
- Roadway flooding



Other Key Implementation Issues

Construction Phase and Long-term Maintenance:

- Soil compaction and top soil removal
- Erosion and sedimentation
- Long-term maintenance to ensure performance