Geodatabase for Sustainable Urban Development

Presented By

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Objective

Build a Geodatabase that will enable urban planners to create and assess the impact of development scenarios.

(sustainable urban development): Development that improves the long-term social and ecological health of cities and towns.

Background

Portland Metro Region Population

- 2006: >1.95 million
- 2025 projection: 2.8 million
- On average, the Metro region gains 500 new residents each week.

Background

Sustainable Urban development must take into consideration:

- the natural environment
- infrastructure capacity
- market forces
- local planning policy
- Socially inclusive

Potential Applications

- Identifying Infill Opportunity Sites
- Analysis of building trends
- Development of land use plans
- Assessing the effects of land use change
- Siting of parks, schools, and public facilities
- Brownfields redevelopment
- Environmental justice analysis
- Transportation planning

Database Structure

Data Sources

- **I:\Students\Data\GIS\RLIS\2007_August**
- **I:\Students\Data\GIS\RLIS\Photo_2001\10FT_01**
- **www.census.org**

Database Structure

DATASETS and FEATURECLASSES

Admin Boundary
- Blockgroups
- Centers
- Cities
- Counties
- Neighborhoods
- Tracts

Land
- Environmental Zone
- Parks
- Title 3
- Title 4
- Vacant
- Zoning

Parcels
- Fire stations
- Libraries
- Hospitals
- Schools
- Permits
- PDX Taxlots

Transportation
- Bus Lines
- Bus Stops
- Max Lines
- Max Stops
- Streets

Database Structure

Other Items

Tables
- Block Group Data
- Tract Data
- Pop and Dwelling Unit Density
- Taxlot Queries

Relationship Classes
- Block Group to Block Group Data
- Tract to Tract Data
- Tract to Density Data
- Taxlot Queries to Taxlots

Photos

2001 10ft Aerial

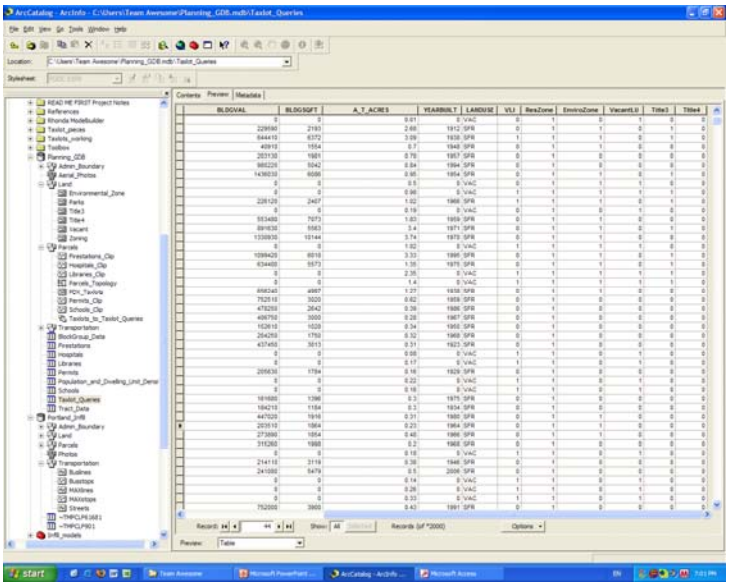
Data Management

Calculate Investment Index
- Building Value / Land Value

Build Spatial Query Table for Taxlots
- Intersects Residential Zoning
- Intersects Vacant Land Inventory
- Intersects Title 3 Land
- Intersects Title 4 Land

Download Census Data
- Population
- Median Household Income
- Population and Dwelling Unit Density

Taxlot Spatial Query Table



Domain Settings

Admin Boundary

Counties/Cities: Name
Neighborhoods: Name
Centers: – Name, Center (3 coded domains)

Land

Parks: Type, Usage (public or private), Park (name)

Parcels

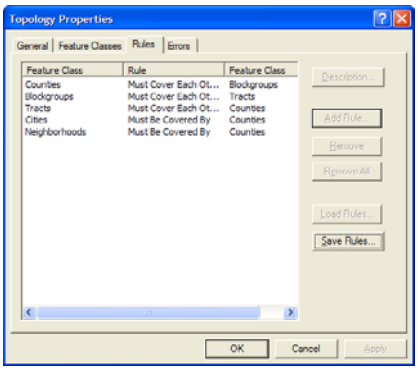
Schools: Level (coded domain values)

Transportation

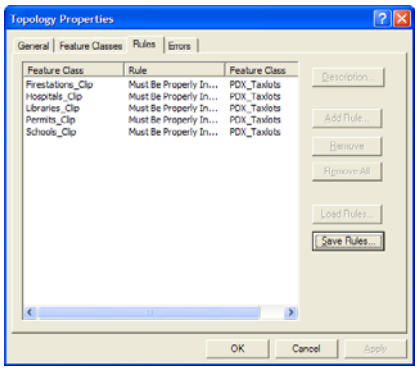
Roads: Prefix (8 coded domains), F type (20 coded domains)

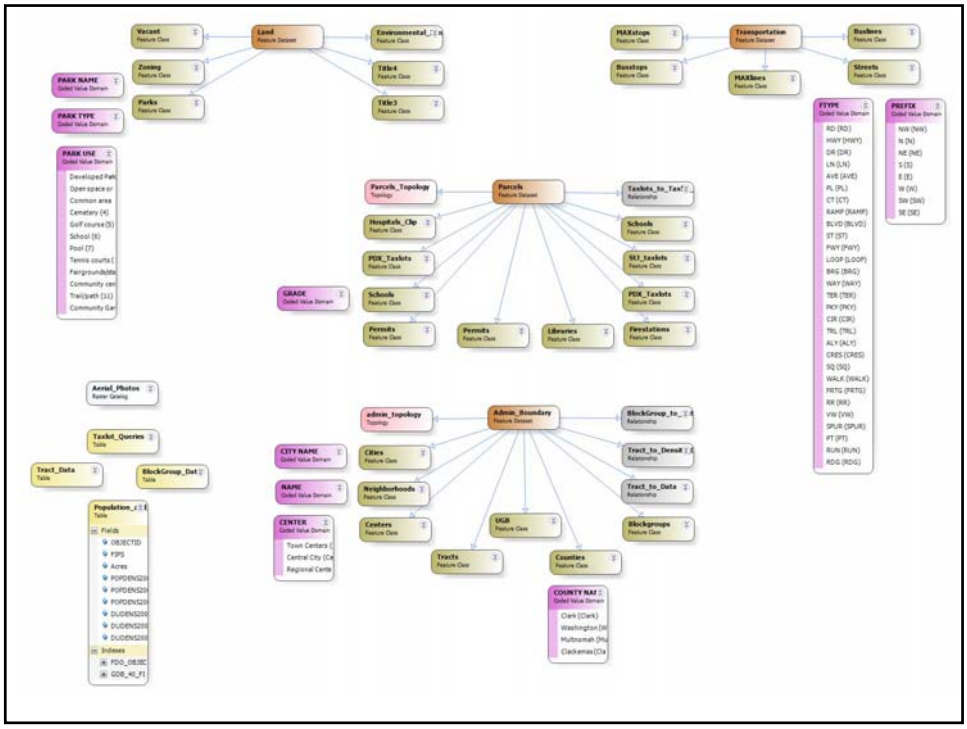
Topology

Admin Boundary



Parcels




Vacant
Land
Environmental
Zoning
Title4
Parks
Title3
PARK NAME
PARK TYPE
PARK USE
MAXstops
Transportation
Builders
Busstops
MAXlines
Streets
FTYPE
PREFIX
Parcels_Topology
Parcels
Taxlots_to_Tax
Hospitals_Clip
Schools
PDX_Taxlots
SUI_taxlots
GRADE
Schools
PDX_Taxlots
Permits
Permits
Libraries
Firestations
Aerial_Photos
Taxlot_Queries
Tract_Data
BlockGroup_Dat
Population_
admin_topology
Admin_Boundary
BlockGroup_to_
CITY NAME
Cities
Tract_to_Densit
NAME
Neighborhoods
Tract_to_Data
CENTER
Centers
UGB
Blockgroups
Tracts
Counties
COUNTY NAI


Application:
Identifying Residential Infill Opportunity Sites
Geodatabase for
Sustainable Urban Development

Demonstration Application

Use the Geodatabase for Sustainable Urban Development to identify infill opportunity sites.

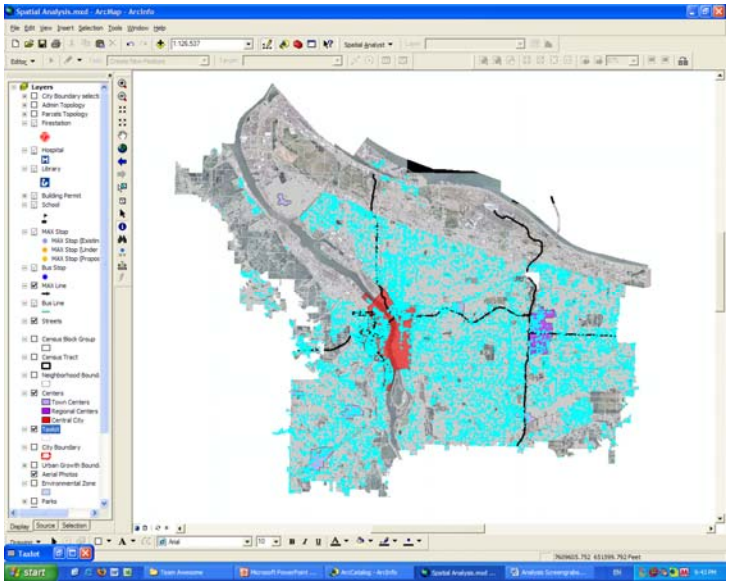
(Infill): The use of land within a built-up area for further construction, especially as part of a community redevelopment or growth management program or as part of smart growth. It focuses on the reuse and repositioning of obsolete or underutilized buildings and sites.

Analysis & Applications

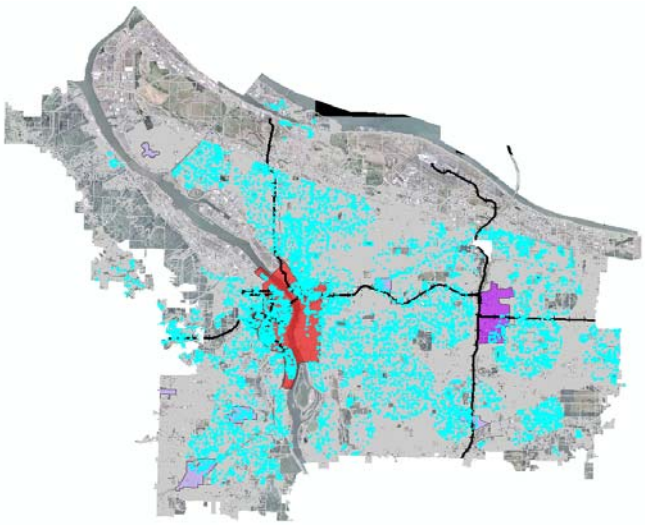
Infill Selection Criteria

1. Residentially Zoned
2. Not in Environmental Exclusion
3. Not Title 3 Land
4. Not Title 4 Land
5. Investment Index < 0.3

Base Infill Selection

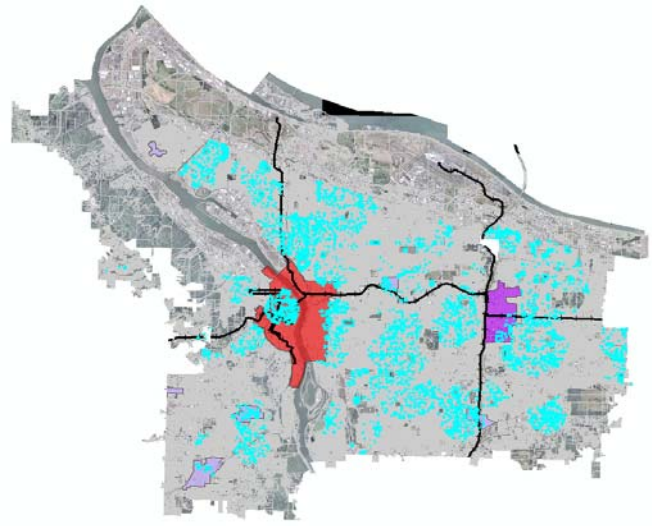


Firestation: Within 1 Mile

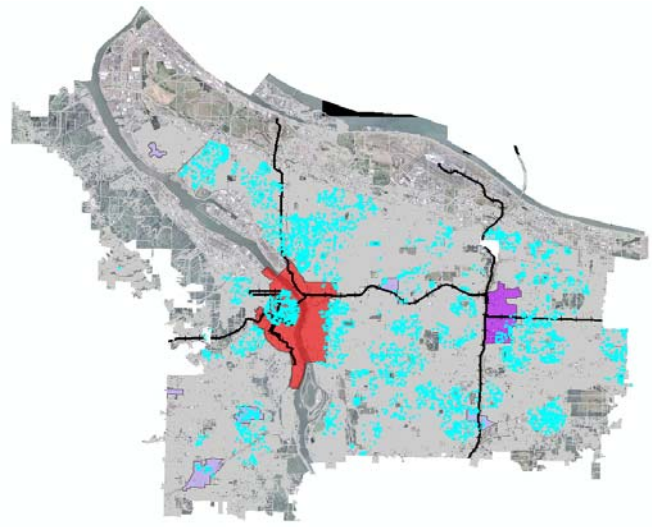


School:

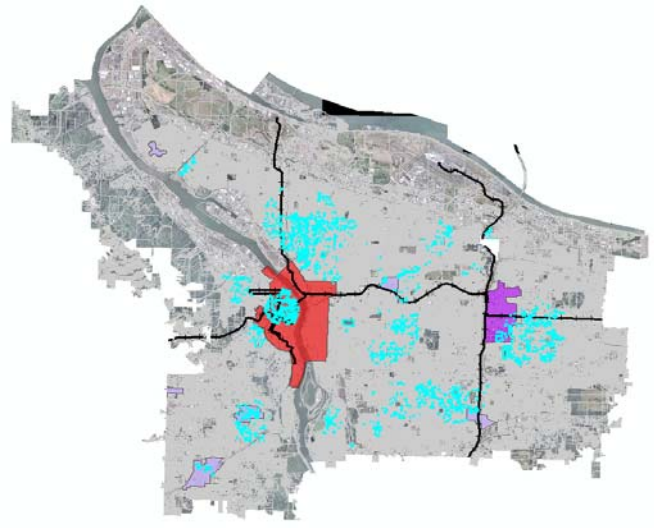
Within 1 Mile of High School
Within ½ mile of Elementary School



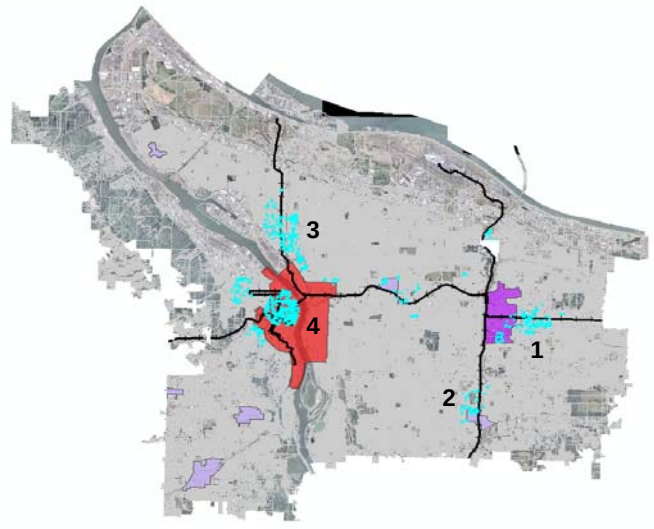
Park: Within ¼ Mile

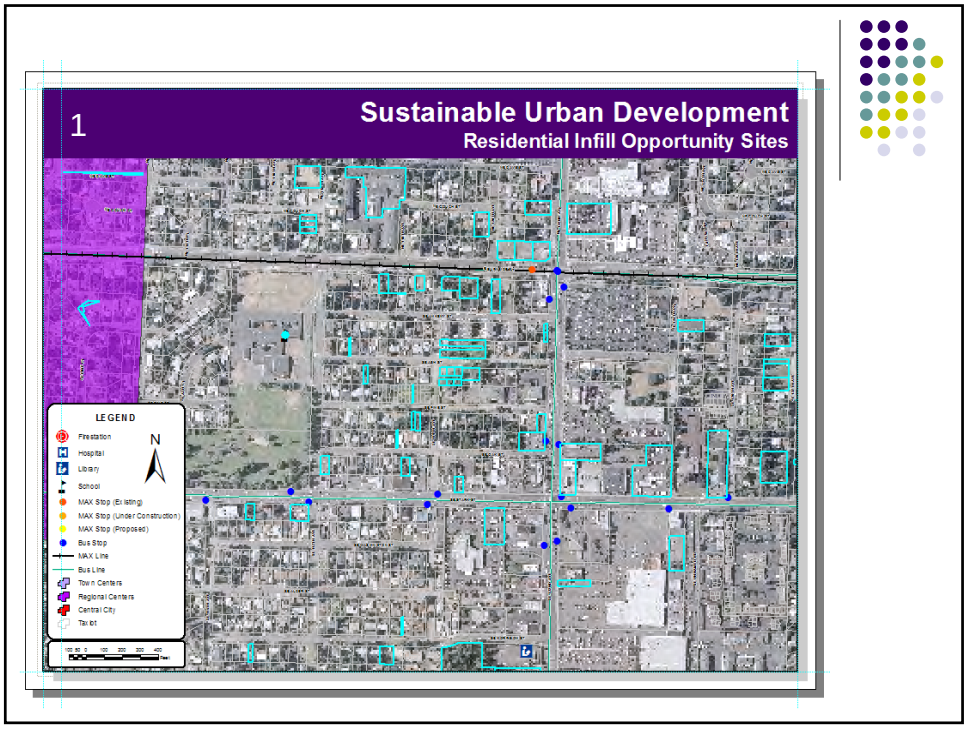


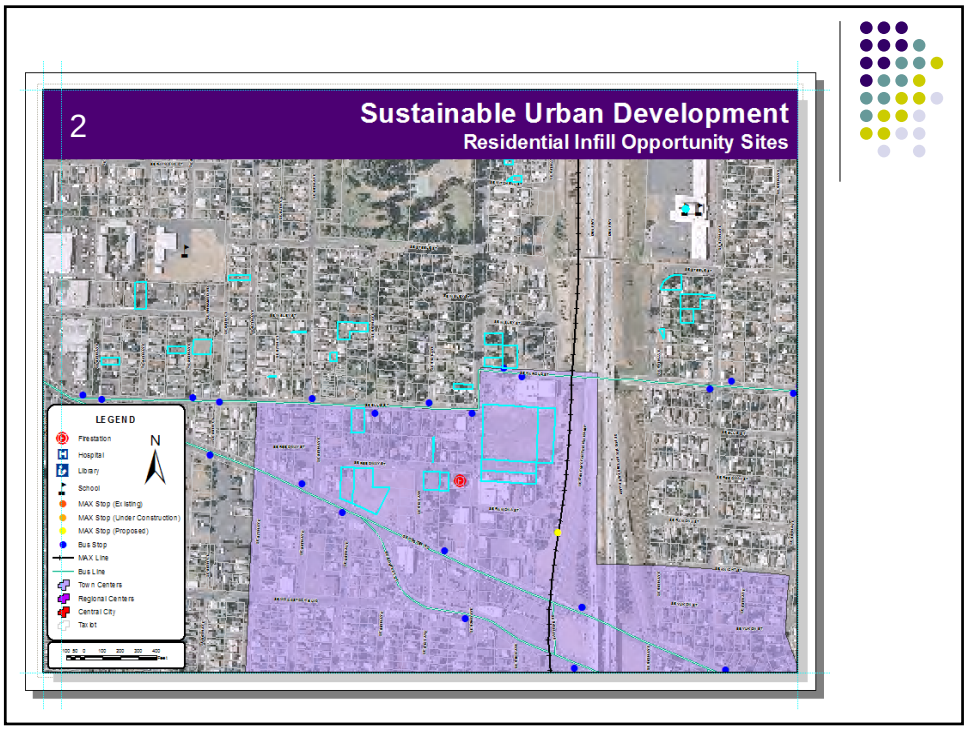
Library: Within 1 Mile



MAX: Within ½ Mile




1
Sustainable Urban Development
Residential Infill Opportunity Sites
LEGEND
Firestation
Hospital
Library
School
MAX Stop (Existing)
MAX Stop (Under Construction)
MAX Stop (Proposed)
Bus Stop
MAX Line
Bus Line
Town Centers
Regional Centers
Central City
Tax lot
N


2
Sustainable Urban Development
Residential Infill Opportunity Sites
LEGEND
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School
MAX Stop (Existing)
MAX Stop (Under Construction)
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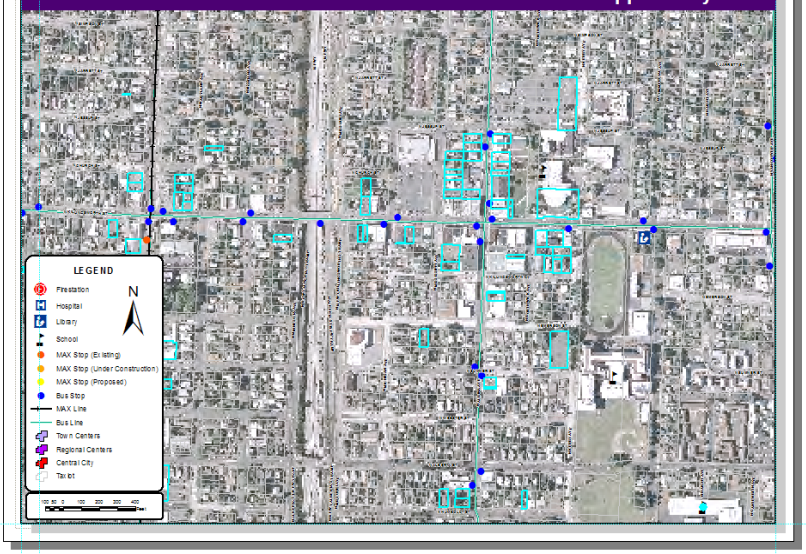
N

3

Sustainable Urban Development
Residential Infill Opportunity Sites



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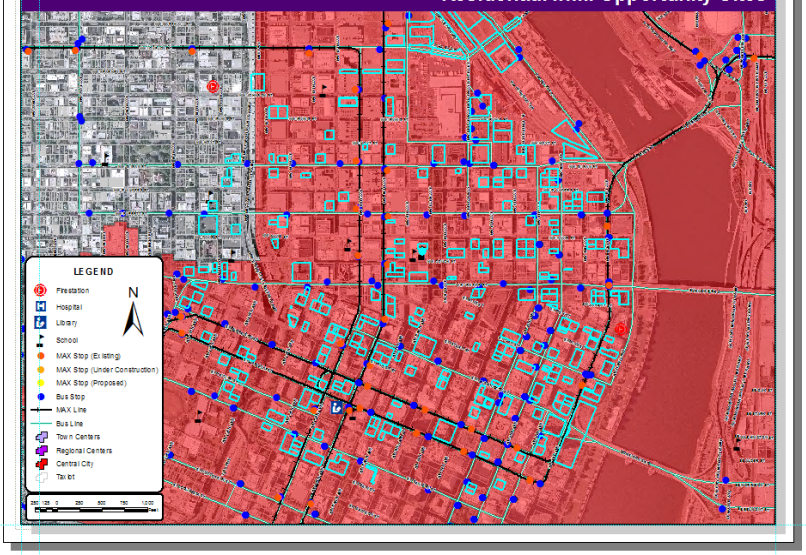
Sustainable Urban Development
Residential Infill Opportunity Sites



Encountered Problems

- Processing speed for data import and spatial analyses
- Database Lock/Multiple Editors
- Limited Access to Data
- Model Builder

Questions

References

- Chang, K. 2008. Introduction to Geographic Information Systems. New York: McGraw Hill, 4th ed.
- Fulton, W., R. Aubry. 2006. Utilizing GIS to help both cities and developers analyze infill development potential. Retrieved October 19, 2007, from Environmental Systems Research Institute Web site: http://www.esri.com/industries/planning/docs/solimar_gis.pdf: 2006-11-25
- Putra, S.Y., W. Li, P. Yang. 2003. Object-oriented GIS data modelling for urban design, In Proceedings of Map Asia 2003 Conference in Kuala Lumpur, Malaysia.
- Putra, S.Y. 2006. Geodatabase for Urban Design and Planning. GIS Development: Middle East, 2(5).
- Visualizing Infill Development Potential: By David Van Mouwerik, IGIS Technologies, and Keith Mann, ESRI - http://www.esri.com/news/arcuser/0807/infill.html
- Produced by The Center for Demographic Research, April 2004. Infill Capacity Analysis of Orange County and Western Riverside County Gateway. http://www.occities.org/occog/Infill%20Capacity%20Study.pdf