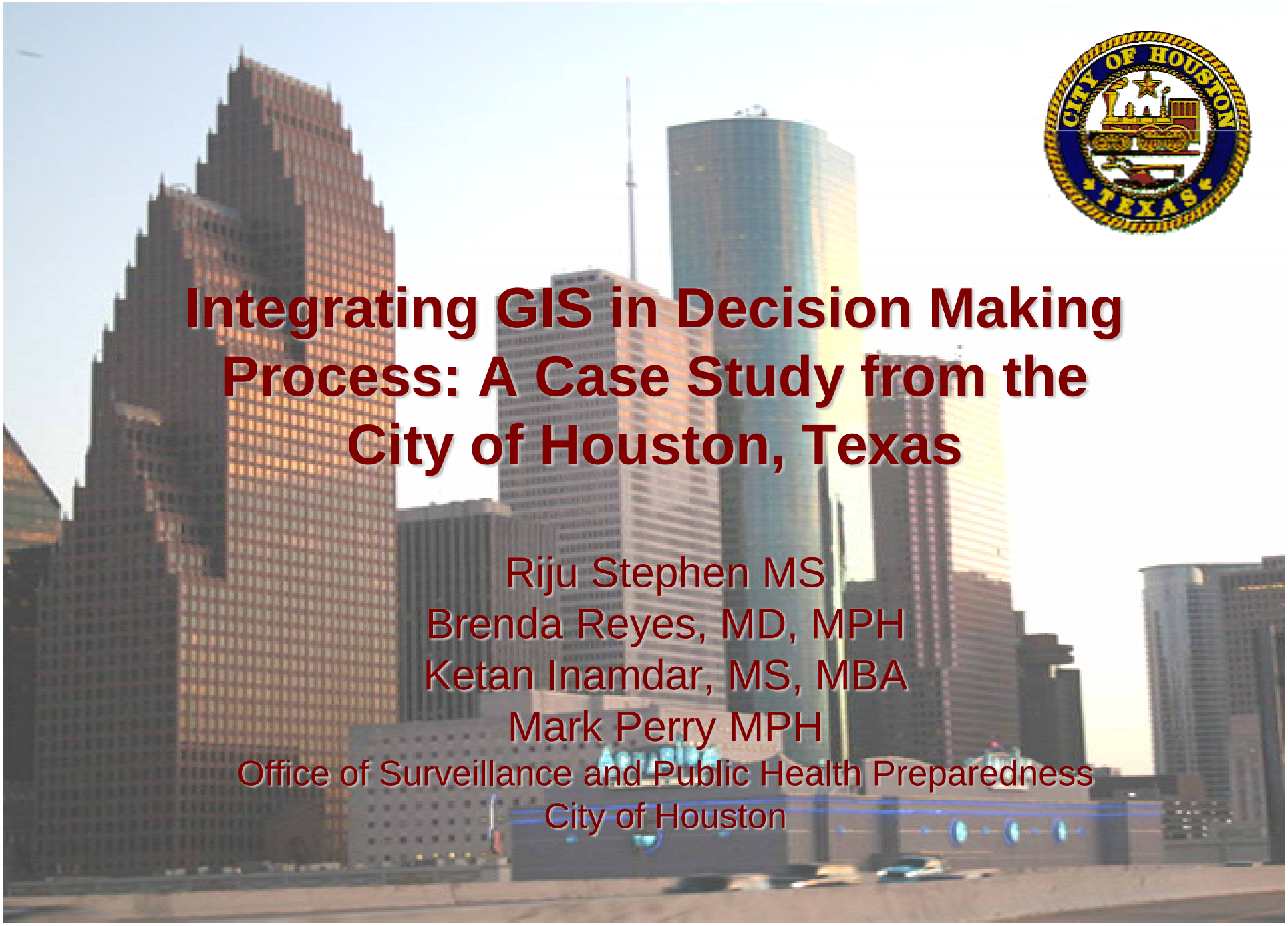


Integrating GIS in Decision Making Process: A Case Study from the City of Houston, Texas

Riju Stephen MS
Brenda Reyes, MD, MPH
Ketan Inamdar, MS, MBA
Mark Perry MPH
Office of Surveillance and Public Health Preparedness
City of Houston

http://www.hotelsbycity.net/images/travelguides/usa/texas/houston-big.jpg

Background

- **The City of Houston is committed to work in partnership with the community to promote and protect the health and social well being of Houstonians**

- **Several projects are in operation to provide service to Houstonians and to make Houston at international standards**

- **The aesthetics of the city landscape should not be compromised at the expense of the projects**

Background (Cont ..)

- **Section 106 of the National Historic Preservation Act**
- **The concurrence of Texas Historical Commission (at Austin) is mandatory**
- **Approval based on LOCATION**
- **Issues in communicating location to the Commission**

The GIS Project

- **Demonstrated how a Geographic Information System could increases efficiency in the business processes**

- **The steps involved in the project are,**
  - **Needs Assessment**
  - **Analysis of work flow**
  - **Creation of a standardized map document**
  - **Installation of a free GIS software**
  - **Training of the employees**

Participating Departments in the Project

- **Community & Children's Environmental Health**
- **Neighborhood Protection Services**
- **Housing and Community Development**
- **Planning Department**

Community & Children's Environmental Health

- **Lead based paint hazard remediation**
  - **Cases are determined for remediation to protect the inhabitants from old paints containing lead**
  - **As the part of the approval process the cases are located on a map**
  - **The map, along with the case file is send to the Texas Historical Commission determines the address does not fall within a designated Historic District boundary**

Neighborhood Protection

- **HPD is responsible for demolition of dangerous buildings (Houston Code of Ordinance)**

- **Buildings older than 1959 requires clearance from the Texas Historical Commission**

Housing and Community Development

- **Construction of Housing Projects**
  - **This may involve demolition of existing buildings**
- **Building of a new Community Facility**
  - **Library or a school**
  - **Make sure it is not too close to historical buildings**
- **The Texas Historical Commission Approves the cases depending on the location**

Planning Department

- **Implementation of Houston HOPE Project**
  - **The Mayor's Initiative**
  - **Buy vacant and delinquent properties**
  - **Affordable Housing Projects**
  - **Create better neighborhoods**

- **Approval of the cases is based on location**

The Process

- **Receive cases (include addresses of applicants)**
- **Location of the cases in a paper map**
- **Submission of cases to the Texas Historic Commission for approval**
- **Approval based on the location**

The Issues

- **How to locate cases accurately on a paper map?**
- **All these processes require showing address accurately on a map**
- **Display spatial relations**
- **How to insists that all the departments make maps consistent with a standard one?**
- **The Texas Historical Commission did not have a standard map for comparison**

Locating the Address in the Old Process

- **Using Key Map (marking it manually)**
- **Send the address to the Planning Department to locate**
- **Receive the address on a map in a .jpg format**
- **Scale, legend and contents may vary each time they receive a map**

The Solution

- **Using a GIS**
- **Advantages and disadvantages**
  - **Advantages**
    - **Can create an address locator**
    - **Add or remove custom layers to the map**
    - **Edit/change the map**
  - **Disadvantages**
    - **Expensive**
    - **Requires extensive training**
    - **Issues involving data maintenance and security**

The Free GIS Solution - ArcReader

ArcReader is a free desktop mapping application that can deliver interactive mapping capabilities. ArcReader is used to explore and print custom maps from published maps using ArcGIS Publisher extension.

- GIS Deployment
- Map Viewing and Navigation
- Data Query and Exploration
- Map Printing
- Configurable and Customizable

Courtesy: www.esri.com

Preparation of Published Map

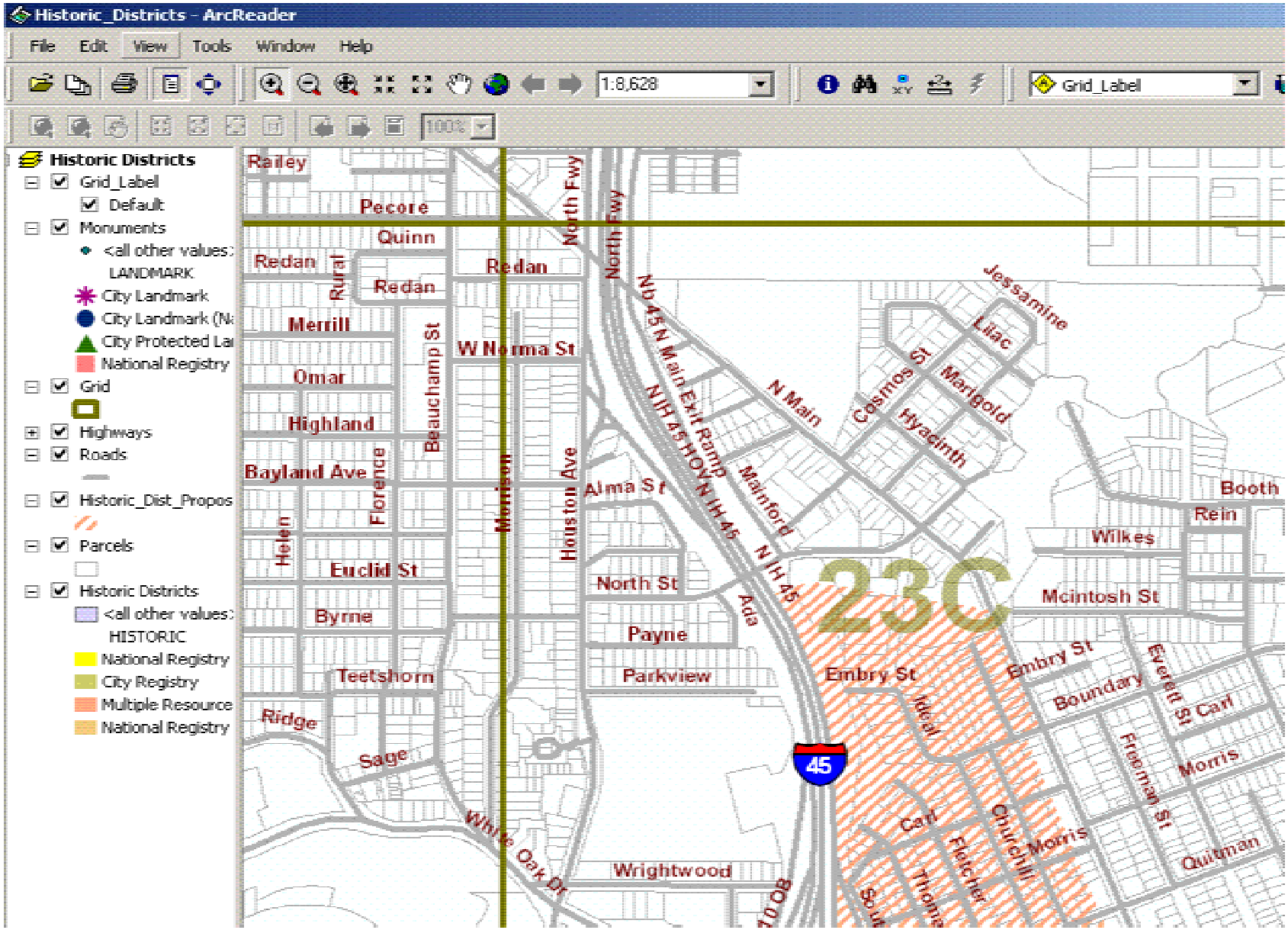
- **A map document (.mxd) is prepared using ArcGIS 9.2 available at another division with the City**
- **The map is published using ArcGIS Publisher extension as a .pmf document.**

The layers used

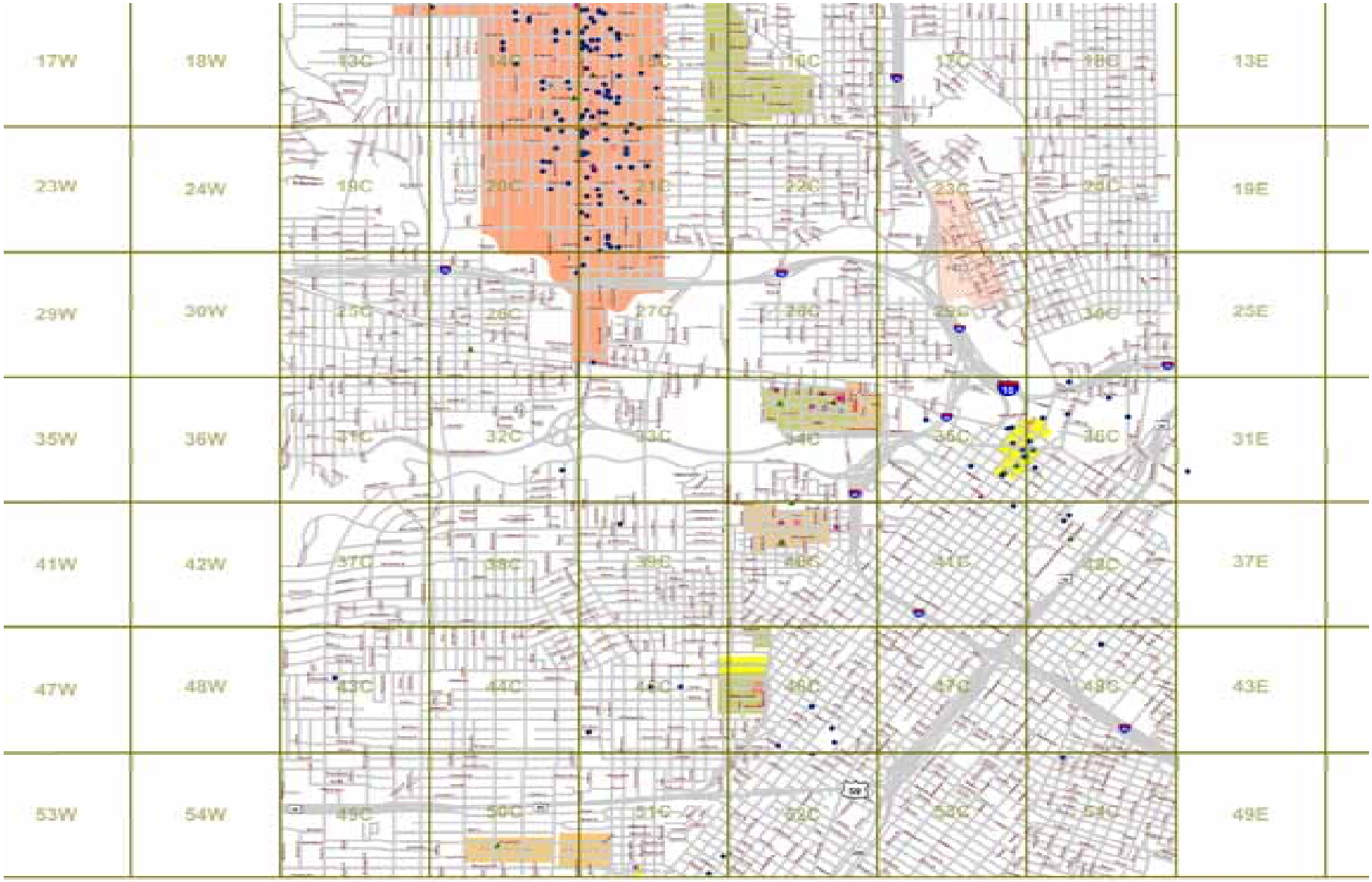
  - **Parcels**
  - **Roads and Highways**
  - **Historic Districts in Houston**
  - **Historic monuments**
  - **Proposed Historic Districts and**
  - **A Custom grid**

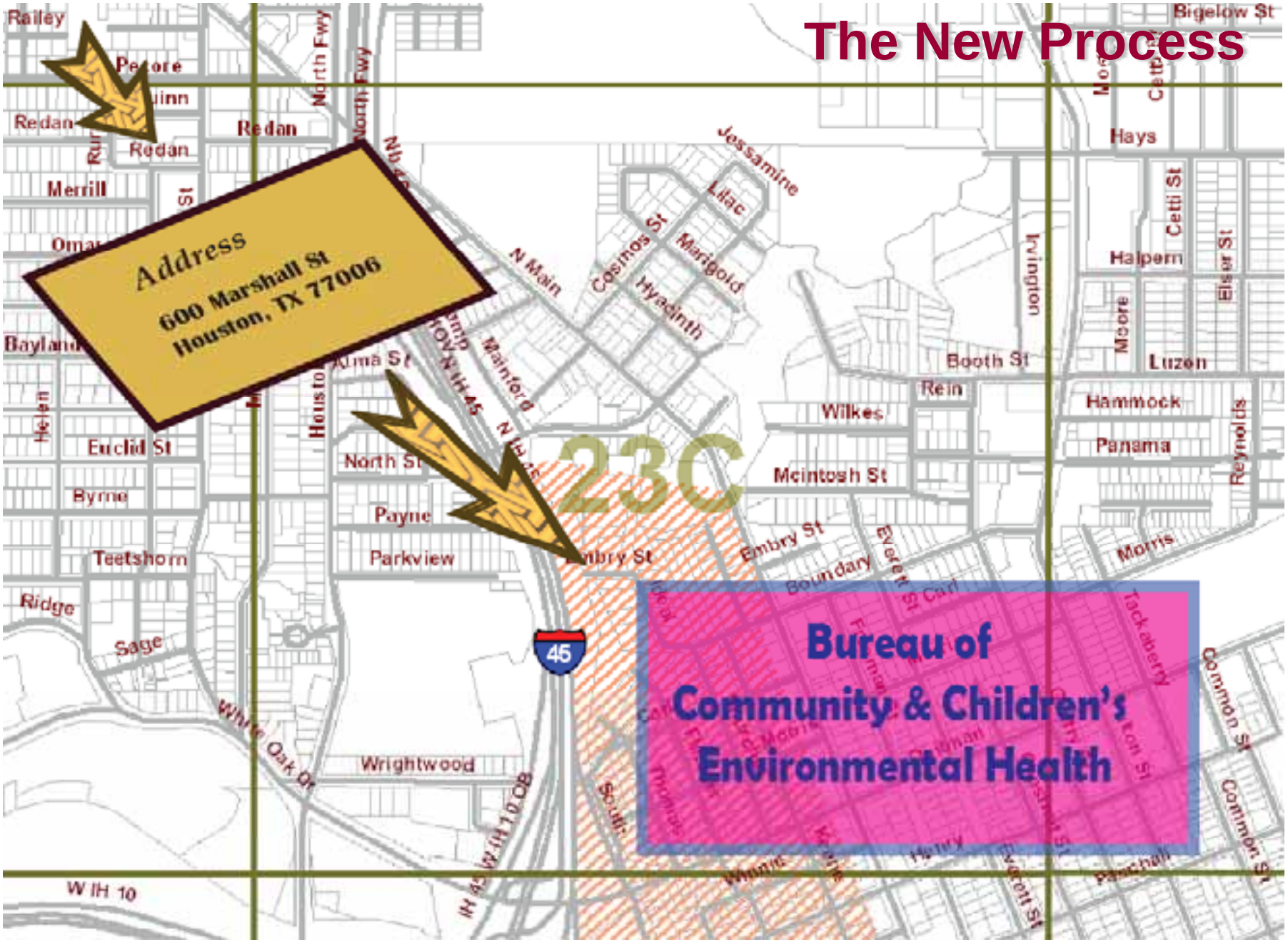
- **The .pmf document is distributed among the user departments**

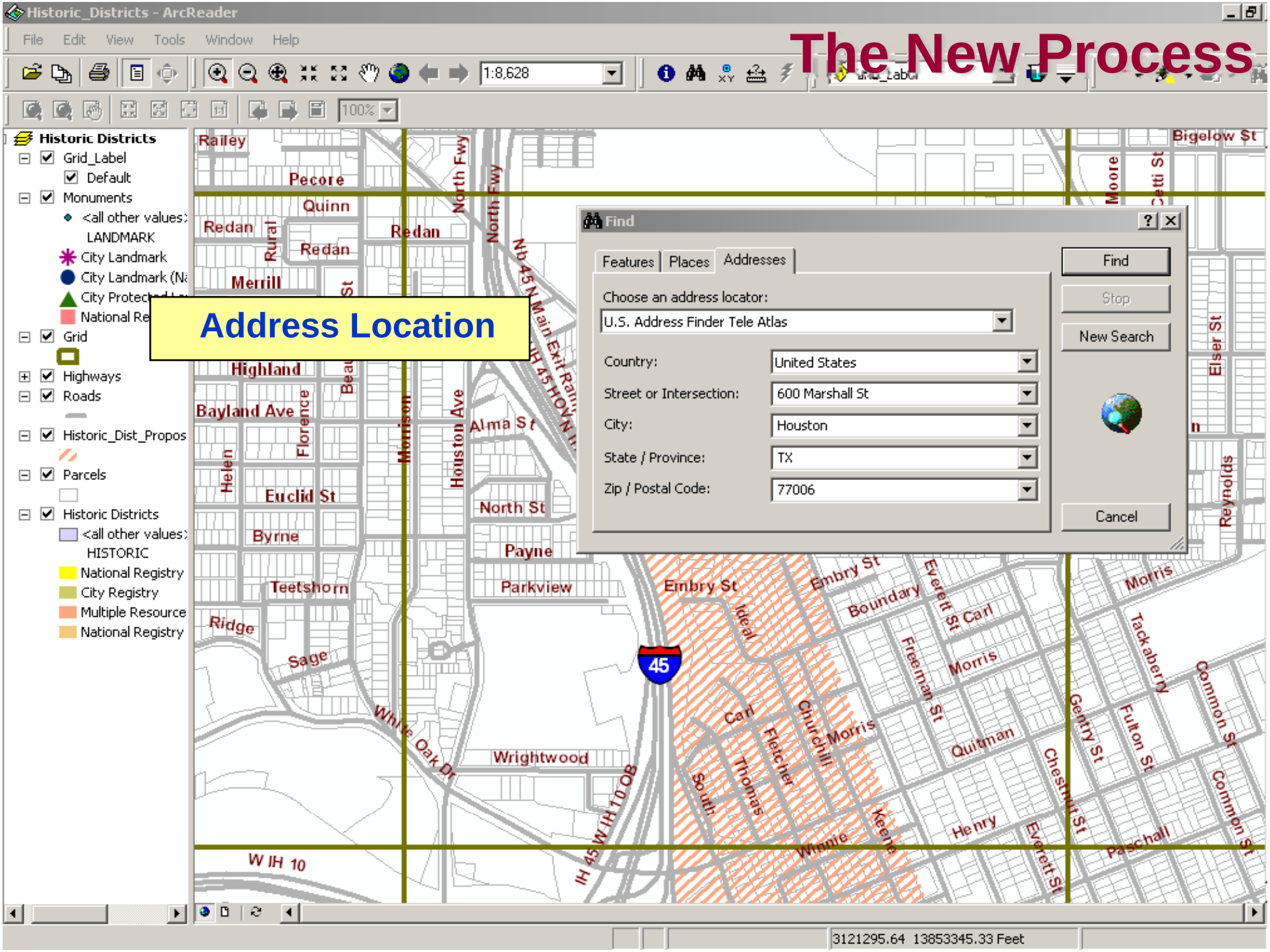
The Published Map (Electronic)



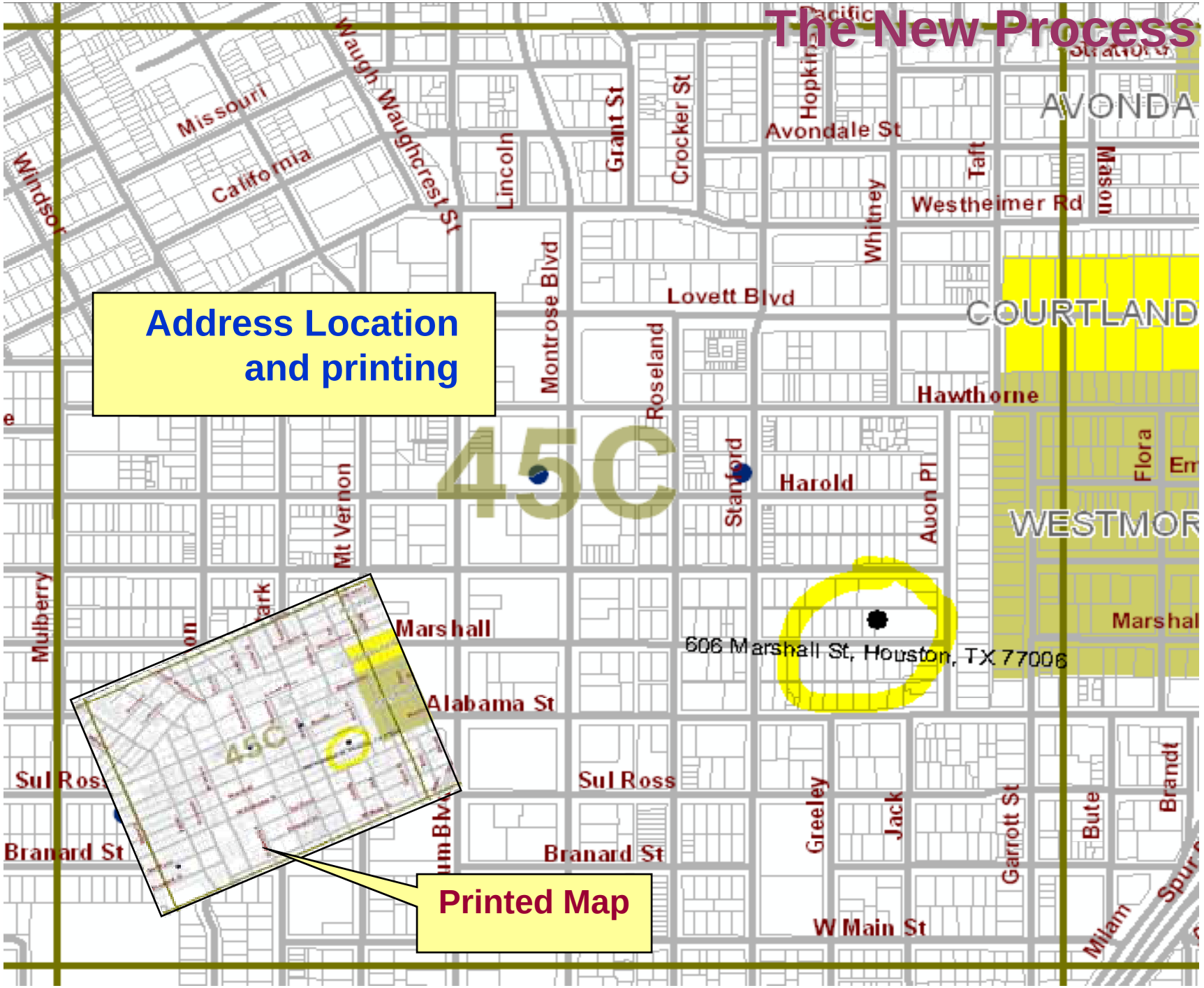
The Map on Paper (Wall Map)




The New Process
Address
600 Marshall St
Houston, TX 77006
23C
Bureau of
Community & Children's
Environmental Health
Railey
Redan
Merrill
Bayland
Euclid St
Byrne
Teetshorn
Ridge
Sage
Parkview
Payne
North St
Wrightwood
White Oak Dr
W IH 10
North Fwy
N Main
Jessamine
Lilac
Marigold
Hyacinth
Cosmos St
Irvington
Booth St
Rein
Wilkes
Mcintosh St
Embry St
Boundary
Everett St
Hays
Halpern
Cetti St
Elder St
Moore
Luzen
Hammock
Panama
Reynolds
Morris
Tackaberry
Common St
Bigelow St
45


Historic_Districts - ArcReader
File Edit View Tools Window Help
1:8,628
100%
The New Process
Historic Districts
Grid_Label
Default
Monuments
<all other values>
LANDMARK
City Landmark
City Landmark (Na
National Re
Grid
Highways
Roads
Historic_Dist_Propos
Parcels
Historic Districts
<all other values>
HISTORIC
National Registry
City Registry
Multiple Resource
National Registry
Address Location
Find
Features
Places
Addresses
Choose an address locator:
U.S. Address Finder Tele Atlas
Country:
United States
Street or Intersection:
600 Marshall St
City:
Houston
State / Province:
TX
Zip / Postal Code:
77006
Find
Stop
New Search
Cancel
Railey
Pecore
Quinn
Redan
Rural
Merrill
Highland
Bayland Ave
Florence
Helen
Euclid St
Byrne
Teetshorn
Ridge
Sage
White Oak Dr
Wrightwood
W IH 10
North Fwy
Nb 45 N Main Exit Ramp
IH 45 HOV N
Morrison
Houston Ave
Alma St
North St
Payne
Parkview
Embry St
Ideal
Carl
Fletcher
Churchill
Morris
Thomas
South
Keene
Winnie
Henry
Everett St
Boundary
Freeman St
Quitman
Gentry St
Chestnut St
Fulton St
Tackabery
Common St
Paschall
Reynolds
Elser St
Moore
Bigelow St
45
IH 45 W IH 10 OB
3121295.64 13853345.33 Feet

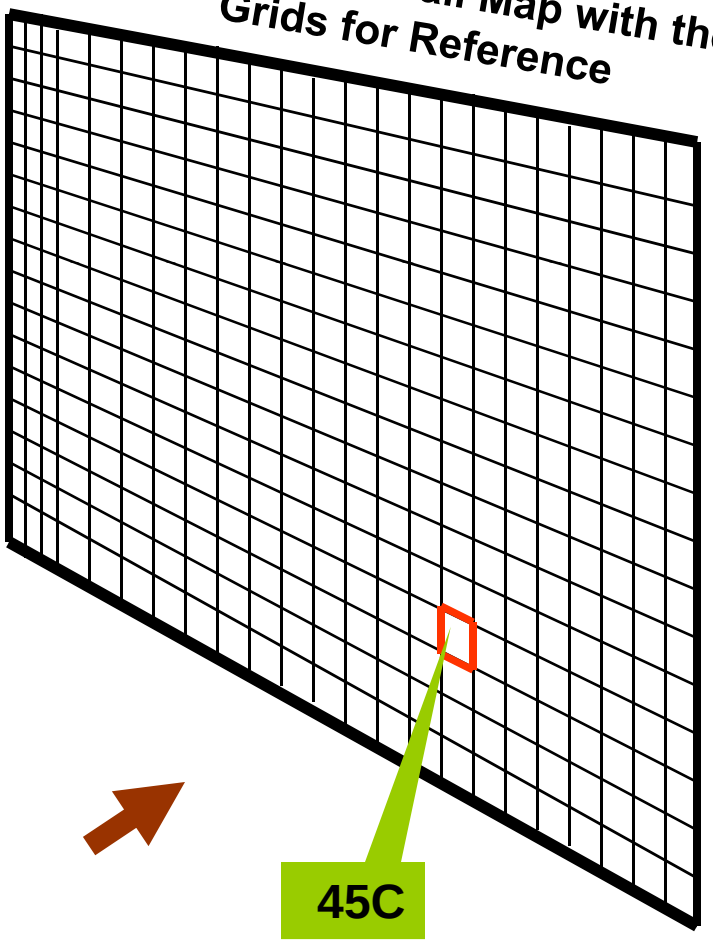
The New Process



The New Process

Submission to the Commission

The Standard Wall Map with the Grids for Reference



Future Plans

- **The City of Houston is moving towards implementing an Enterprise GIS**
- **Web-based UIs which help search published map document may be made available for all City Departments that has the same kind of location problems**
- **ArcReader can be integrated with the Enterprise Map Printing (EMP) application to make standardized maps to solve location problems**

Acknowledgements

- **Community and Children's Environmental Health, City of Houston, Houston, TX**

- **Community Health Statistics (CHS), Office of Surveillance and Public Health Preparedness, City of Houston, Houston, TX**

- **The Texas Historical Commission, Austin TX**