

**City of San Diego
General Services Department
Street Division**



GIS – SWEEPING OUR STREETS



Co-Authors: Elizabeth Mueller,
Fay Faulkner

The City of San Diego, the 7th most populated City in the United States with more than 1.2 million residents, is located in the southwest corner of the country and is contiguous to the Pacific Ocean. The General Services Department, Street Division is responsible for the maintenance of more than 2900 miles of City Streets, 5,000 miles of sidewalk, 210,000 trees, 50,000 drain structures, 53,000 street signs and 41,000 street lights, all critical to the smooth operation of the city. It's a job that's easier said than done.

As part of the Street Division's commitment to excellent customer service, the Urban Forestry section plants and maintains San Diego's 210,000 city-owned trees and is also responsible for Street Sweeping (Figure 1). The section also offers 24-hour emergency response for any hazardous conditions that occur with streets, alleys, sidewalks, trees, storm drain structures, street lights and signs.



Figure 1 - One of Street Divisions GPS equipped Street Sweeping vehicles

Technology is a key part of the Street Division's maintenance and repair systems. Over the last four years, the division has implemented an innovative, customized SAP-based system that enables state-of-the-art work management. It's all part of what the division calls its "Synergy V Project." It's an ongoing improvement program that uses technology to streamline workflow, increase efficiencies and cut costs.

Using this SAP-based work management system, the division accurately plans and tracks street repairs. The system allows for the tracking of all work performed as well as the location and maintenance to all inventories supported by Street Division. Of special

interest is the SAP/GIS Browser (Figure 2), which ties both SAP and GIS data together. It allows viewing of current requests on-line, and the creation or update of requests found spatially. This has proven to be a powerful tool that provides significant information and edit capabilities to the day to day users with a simple, understandable interface. It uses the online mapping tool to allocate people and resources in the most optimal way. Productivity and performance is closely managed with an eye toward overall cost-savings. Excellent customer service is enabled through fast, online interaction. Citizens can use the Web site to report a needed street or structure repair 24 hours a day, seven days a week.

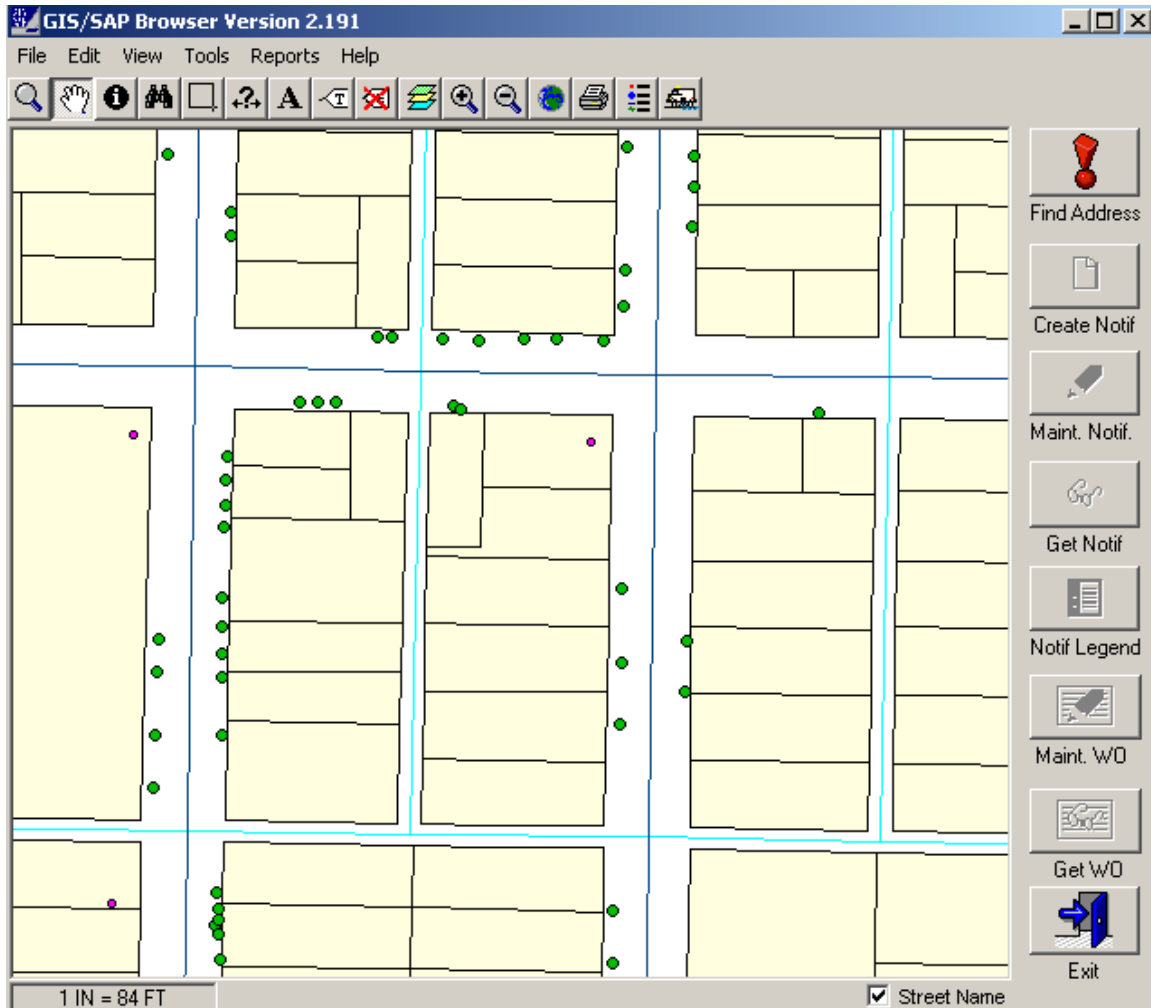


Figure 2 – Street Divisions SAP/GIS Browser displaying street trees (green) and street light (red) locations

The Synergy Project has been business-driven. It was spurred by an overall goal to improve city operations and customer service. The project was not pushed through as an information technology (IT) upgrade, but instead was motivated by a desire to improve business processes. “Synergy” is not only the project name, but it’s also an accurate description of the division’s new culture of efficiency and excellence. Synergy is a project with no definite end because the division will always strive to be better and more efficient.

The Street Sweeping (GPS) Global Positioning System Application was created as part of the City's "Synergy V" Program. This GPS application was created based on the primary need to track the street sweeping process down to an individual street section.

The Street Sweeping Application utilizes an on-board computer application called FM200. A GPS receiver allows the on-board system to time stamp exact vehicle location and provide a bread crumb trail for mapping programs that are added as an option. At the same time as it captures GPS points, the on-board computer gathers driver and vehicle information and saves the data. All the information is downloaded at the end of the shift via a trip extraction key and loaded into the FM2002 software which is loaded on the desktop computer and the data is stored in a SQL data base.

As part of this application, a middle-ware tool was developed to extract the information from the data base and prepare the data for uploading into the Synergy Work Management System. This data provides the information needed for reporting work in the Synergy Work Management System. The users have custom screens within this tool to add additional driver log data including amount of debris removed, water usage and miles swept. This information can then be used to create numerous reports and provide critical street sweeping performance information for management (Figure 3). On the GIS mapping side of the Synergy Work Management System, the street sweeping information collected is available by selecting any street segment on the map. The date of last sweeping is displayed along with the route number and scheduled day of sweeping

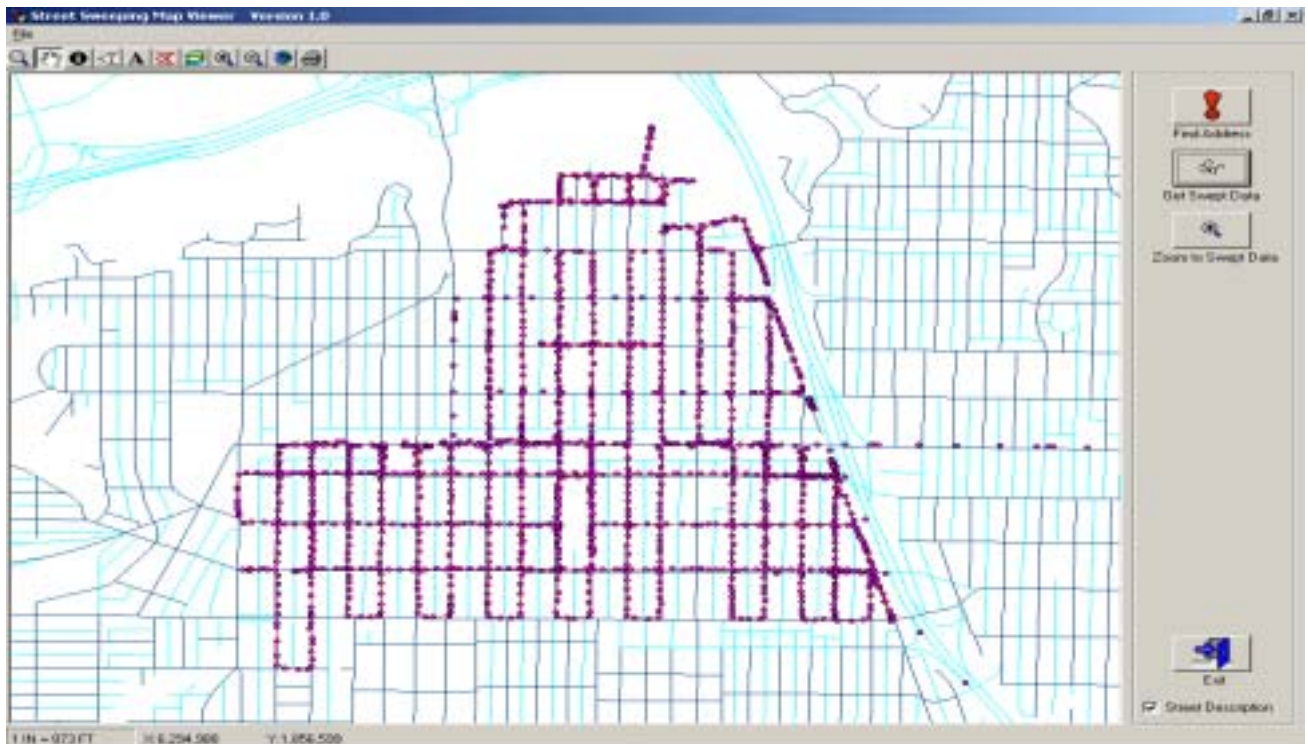


Figure 3 - GPS Points collected during sweeping route

One of the primary benefits from the new application is the ability to respond to citizen and other customers of the Street Division with accurate sweeping information down to the exact street segment (Figure 3). Secondly, the information gathered has allowed the division to perform analysis by identifying streets that were being missed by the operators and including them into the routes to insure that sweeping was performed equitably. Thirdly, periodic reports can be run to determine areas in need of an increase or decrease in frequency of sweeping due to changes in levels of debris encountered on the route. Vehicle performance can be analyzed to ensure accurate sweeping speed, safety measures are being used and that proper sweeping methods are being followed (Figure 4).

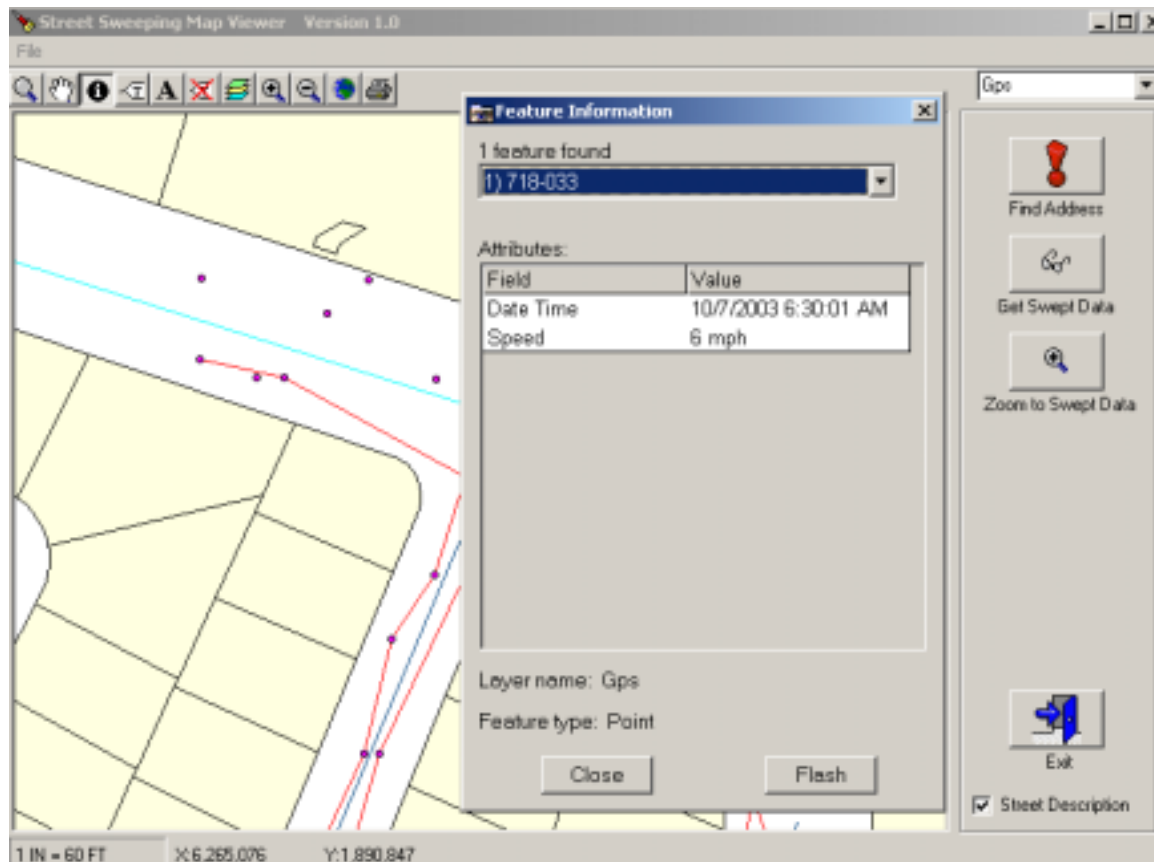


Figure 4 – Identifying a GPS point on the map provides vehicle speed, date and time sweeping occurred.

Street sweeping and snow plowing are similar in applications, and are a hot topic in the area of public works maintenance of streets. The use of this GPS, state of the art solution, has led to a more efficient way to plan, track and monitor operations such as street sweeping and provide advanced customer service at the same time.

All of these benefits, taken together, help to ensure that the City of San Diego keeps the city streets clean and free of debris and maintains the highest level of water quality for the many streams, bays and beaches.

Soon Street Division hopes to make “Synergy” mobile. Not just the 120 staff members in the office, but also the field crews will access the system using the new technology. The division will soon test rugged mobile devices and design a prototype system.

The benefits of Synergy go beyond the Street Division. Employees from other departments, including Development Services and Engineering and Capital Projects can access it. They use it to gather data to track city assets and view work schedules which may impact their departments.