Notes on elevation datums used in the City of Anaheim

A frequently asked question of the survey section is, "I'm looking at this old plan from 1955 (or so) and the elevations don't match what I have today – what's wrong?"

Well, in most cases there's nothing "wrong" it's just that a different elevation datum has been used.

Going through the survey field records we have on file (which date back to 1921) it appears that up until 1963 Anaheim used elevations based upon a local datum. An elevation set on a monument in front of Anaheim's original City hall was the point held for reference.

In 1963 a general adjustment was made to bring the benchmark elevations throughout the City in line with the United States Coast and Geodetic Survey (USCGS). This meant that elevations were *increased* between 5.15 feet to 5.39 feet (or in other words the datum was *lowered* 5.15 to 5.39 feet). The datum for this system was the North Geographical Vertical Datum of 1929 (NGVD 29), which is based on tidal station readings for mean sea level.

In 1988 the USCGS adopted a new datum (based upon a geopotential or 'gravimetric' surface) known as the North American Vertical Datum of 1988 (NAVD 88). This created a further shift in elevation of an additional 2.12 feet to 2.36 feet throughout the City. The bench mark index books on file in the City listed both NGVD 29 and NAVD 88 elevations for every benchmark up until January of 2006 when at such time they were changed to show NAVD 88 elevations only.

From 1988 until July 2000 surveys were performed in Anaheim based on either the 1929 or 1988 datum. Close attention to the elevation datum on these old plans and notes must be taken.

In July 2000 it was decided, to reduce confusion and inconsistencies, that all survey work done by city crews to be based on the 1988 datum.

In 2007 the City moved out the paper only era and went "on line" with its bench mark information where the most current data can be found today.

So, getting back to answer the question about what's wrong with the elevations on your plan, let's take an example and adjust the old information to find out what it should be today.

Your 1955ish plan shows an elevation of 401.59'
If we make the 1963 adjustment of + 5.39'
Then adjust for the 1988 adjustment of + 2.36'

Then the elevation you have today is……..409.34'

However, note that this will only be approximate for as mentioned above the range of adjustments are between 5.15 to 5.39 and from 2.12 to 2.36 which means that today's elevation in the example above can actually range from 408.86' to 409.34'. A spread of 0.48'. So if in doubt, there's no substitute for physically measuring the points in question using today's bench mark information.

Metric elevations

Sometimes you find plans and notes that are in Metric (meters).

To convert the City's bench marks elevations from feet to meters, multiply the elevation in feet by the factor 0.304801.

Example 450.62ft x 0.304801 = 137.349m

To convert from meters to feet multiply the meter elevation by the factor 3.2808333

Example 137.349m x 3.2808333 = 450.62ft

The City's bench marks

The bench marks that are found in the field are typically brass caps that are set into the tops of curbs or other solid fixture and are placed in easy to find locations.
The bench mark system is continuously maintained and every effort is made to keep the information current. Occasionally, benchmarks that are listed cannot be found. They have fallen victim to construction or vandalizism beyond our control.
Benchmarks that are lost or are scheduled to be removed are typically re-set in a location nearby the original location but never in the same location. The new benchmark has it's elevation established using the "three wire method" using optical instruments, typically running from one known benchmark, through the new benchmark and tying into another known bench mark. After making the appropriate adjustments the new bench mark is then described, added to the data base, then uploaded into the web site.

Summary

So it can be seen that it is very important when working with old plans or field notes that you consider the vertical datum that was in use at the time the plans or notes were created. Knowing how they relate to the elevations we use today is critical before using the information for studies or design work.

If you have any questions please contact the survey office at (714) 765-5284 or check the links to "datums" for more information.

Abbreviations found within the bench mark descriptions:

CL	Centerline
TC	Top of Curb
CB	Catch Basin
BCR	Beginning of Curb Return
ECR	End of Curb Return
MKD	Marked
C of A	City of Anaheim
BM	Bench Mark
OCSBM	Orange County Surveyor's Bench Mark