> "All the people who cycled in 2005 were 'cyclists'.... The infrastructure needs to be made for those who are not cyclists." —Manuel Calvo on Sevilla's 2007–2011 bike boom[1]

> "If you build it, they will come." — *Field of Dreams*, paraphrased[2]

Nearly 30 years ago, a collection of American bicycle trade, rider, and regulatory groups "acknowledged that increasing the level of bicycling... will not happen as long as people believe that there are too few safe places to bicycle".[3] It is, therefore, not surprising that the Spanish city of Sevilla found that, in "the absence of any cycling infrastructure", "negligible amounts" of travel was done by bicycle (less than one percent of total trips) prior to 2005.[4]

Sevilla is of particular interest because it is similar to Washington, DC—the city of Washington has a 2017 population of just under 694,000, in a region of 6.2 million;[5] the "city of Seville has a population of approximately 700,000...[while] its whole Metropolitan Region has some 1.5 million inhabitants".[6] Washington, similarly, saw a bicycle modeshare of roughly 1% of commute trips in 2000.[7] Sevilla is an ancient city, dating to at least the 7th century BCE; for a time in the 12th century it was a capital of Muslim Iberia, and today is capital and largest city of the Spanish region of Andalucía. Washington, though young for a world capital, is relatively old for a major US city; not only does it have a number of historic districts, but even some of the streets themselves have historic status.[†]

The 1992 statement concludes, "more people would bicycle if they felt safer doing so".[3] A 2012 study found that "bicycle-specific facilities are associated with lower risks" to riders, and that cycle-tracks—that is, paved, bike-only routes alongside a street but separated with a physical barrier of some sort—posed the least risk.[9] Be-

[†]See, for example, the District Department of Transportation's Eastern Downtown Protected Bike Lane Feasibility Study: "the study area includes portions of several historic districts, and contains several historic properties.... All three streets [under consideration]...(9th St NW, 6th St NW, and 5th St NW) are historic streets designated on the original L'Enfant plan for DC."[8]

ginning in 2004, the city of Sevilla created a network of such cycle-tracks, largely 2.5-meter-wide two-way paths, alongside roads between the parking lane and sidewalk. While previously the city had had "only sparse and unconnected bike paths", they built 77 km of bike paths in the 18 months from August 2006 to December 2007; a further 43 km was built between June 2009 and June 2010, and by 2015 "it reached…164 km (including recreational and pedestrian-shared paths), which makes it 12% of the total road length in the city".[6]

As the city built out its cycletrack network, the proportion of people who bike (modeshare) in the city of Sevilla went from "negligible" to over 5%—already more than most American cities in under 10 years. The average daily bicycle traffic count at a given point on the system rose more than 450%, from just shy of 350 to over 1900. "This effort, in such a short period of time, has been a valuable tool for the promotion of bicycle mobility in a city without a tradition for cycling".[6]

The demographics of Sevilla's riders also changed in this period—that is, not only the *number* of riders changed, but also the *who* of riders. While "Dutch, German, and Danish women cycle as often as men", only "29% of daily bike commuters in Canada were women", and 24% in the US.[10] As in North America, Seville's women made up 25% of riders in 2006; though they didn't reach Northern European levels after the cycletracks were built, the proportion of riders who were women did rise to 32% in 2011.[6] By contrast, Washington has an unusually high rate of female cyclists—for a North American city: in 2008, roughly one third of commuter cyclists were female, more than peer US cities, but still well below those in Northern Europe.[10]

In the years 2000–2014, the District of Columbia added 57 miles (91.7 km) of unprotected bike lanes, 3 miles (4.8 km) of cycle tracks, and 10 miles (16.1 km) of multi-use trails, for a total of 112.6 km of new bike infrastructure, 20.9 km of it protected or completely separated from automotive traffic.[7] In the same period, the proportion of District residents riding a bike to work rose from "just roughly

1% in 2000 to more than 4% in 2012", with modeshare in some neighborhoods approaching 15%.[7]

It's hard to over-emphasize two key points of the Sevillian experience: the fact that they built a *connected* network all at once, and that they built an entire system of *segregated*, protected spaces—Sevilla built as many miles of protected cycletrack between 2006 and 2010 as Washington built bike infrastructure overall between 2000 and 2014. "Segregation from cars and buses, as well as continuity, are essential characteristic of this network, which was not designed to fulfil the needs of current cyclists, but to be attractive to potential ones".[6] This is reflected in the fact that while Washington experienced a substantial growth of 300% in its bicycle modeshare in 12 years, Sevilla's modeshare rose nearly 500% in half as much time.

Another city which rapidly expanded its bike network recently is Calgary, Alberta, where the city built a small network of cycletracks in the Downtown area in 2015, roughly doubling its downtown bikeway network to about 3.6 miles (5.8 km).[11] Within three months, weekday bike counts on the new cycletracks were nearly double counts in the same places before the cycle tracks opened, and the proportion of riders who were women was 27%, up from 20% at those Downtown locations and 22% city-wide before the tracks.[12]

Meanwhile, although the absolute number of bicycle crashes in Sevilla rose 152%, from 53 in 2002 to 134 in 2010, the number of trips by bicycle rose so much that the number of injuries per 100,000 trips actually dropped, to 0.840 in 2010.[6] The risk posed to riders is measured not just by the number of collisions involving cyclists overall, but also by their severity. A 2013 review of literature on cycle-track safety found that "constructing cycle tracks on busy streets reduces collisions and injuries" and that certain intersection treatments, such as building up raised crossings and "essentially providing a speed hump", reduce injuries further.[13] Not only did the number of collisions involving bicyclists in Sevilla decrease, as mentioned above,

"the risk of being killed or seriously injured at each collision also dropped after the implementation of the network of bikeways"—by nearly 50%.[6,14]

Already by 2013, Sevilla was being rated as having "the safest and most convenient bicycle lanes" in Spain and the number 4 "most bike-friendly" city in the world.[15] Although Washington has made strides recently, rising in 2018 from Silver to become one of 30 Gold-level Bicycle Friendly Communities in the US according to the League of American Bicyclists,[16] this is only the third level on a five-step scale—and even its upper levels require benchmarks that would leave a city well behind leading European cities.[17] Sevilla's experience is a striking example for how to advance up that scale, and quickly, and should be looked to in depth by the District of Columbia and any other city wanting to improve its 'bicycle friendliness'. "To make cycling easy and comfortable for everybody, the infrastructure has to be segregated (from motorised traffic), coherent, continuous, visible, uniform and easy to recognize and interpret".[6]

---

[1] People For Bikes, "PlacesForBikes" (May 2, 2018), Twitter, https://twitter.com/PlacesForBikes/status/991656135102029824.

[2] Levinson, David, "Fielding Dreams – Hypotheses About Induced Demand and Induced Supply," *David Levinson, Transportist* (Jan. 18, 2018), https://transportist.org/2018/01/18/fielding-dreams-hypotheses-about-induced-demand-and-induced-supply/.

[3] Clarke, Andy, "Bicycle-Friendly Cities: Key Ingredients for Success," in *Non-motorized Transportation* (Transportation Research Record, 1372; National Academy Press, 1992), 71–5, http://onlinepubs.trb.org/Onlinepubs/trr/1992/1372/1372.pdf.

[4] Marqués, R., Hernández-Herrador, V., and Calvo-Salazar, M., "Sevilla: A Successful Experience of Bicycle Promotion in a Mediterranean Context," in *The Sustainable City IX*, ed. N. Marchettini et al. (WIT Transactions on Ecology and the Environment, 191; WIT Press, 2014), 769–81. doi: 10.2495/SC140651.

[5] US Census Bureau, Population Division, *Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2017* (2018), https://factfinder.census.gov/.

[6] Marqués, R. et al., "How Infrastructure Can Promote Cycling in Cities: Lessons from Seville," *Research in Transportation Economics*, 53 (Nov. 2015), 31–44. doi: 10.1016/j.retrec.2015.10.017.

[7] "Bicycle Element," in *MoveDC: The District of Columbia's Multimodal Long-Range Transportation Plan* (District Department of Transportation, Oct. 2014), http://wemovedc.org/resources/Final/Part%202_Plan_Elements/Bicycle.pdf.

[8] Sabra, Wang & Associates, Inc., *Eastern Downtown Protected Bike Lane Feasibility Study* (District Department of Transportation, Feb. 2017), https://docs.wixstatic.com/ugd/2d024d_4a741835d54f41c89151acf8eff8e960.pdf.

[9] Teschke, Kay et al., "Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study," *American Journal of Public Health*, 102/12 (Dec. 1, 2012), 2336–43. doi: 10.2105/AJPH.2012.300762.

[10] Pucher, John, Buehler, Ralph, and Seinen, Mark, "Bicycling Renaissance in North America? An Update and Re-Appraisal of Cycling Trends and Policies," *Transportation Research Part A: Policy and Practice*, 45/6 (July 2011), 451–75. doi: 10.1016/j.tra.2011.03.001.

[11] Andersen, Michael, "Calgary rolls out a downtown protected bike lane network all at once," *Green Lane Project blog* (June 18, 2015), https://peopleforbikes

.org/blog/calgary-rolls-out-a-downtown-protected-bike-lane-network-all-at-once/.

[12] Andersen, Michael, "Calgary's quick-build protected bike lane network doubled bike counts in three months," *Green Lane Project blog* (Apr. 4, 2016), https://peopleforbikes.org/blog/calgarys-quick-build-protected-bike-lane-network-doubled-bike-counts-in-three-months/.

[13] Thomas, Beth and DeRobertis, Michelle, "The safety of urban cycle tracks: A review of the literature," *Accident Analysis and Prevention*, 52 (Mar. 28, 2013), 219–27. doi: 10.1016/j.aap.2012.12.017.

[14] Marqués, R. and Hernández-Herrador, V., "On the effect of networks of cycletracks on the risk of cycling. The case of Seville," *Accident Analysis & Prevention*, 102 (May 2017), 181–90. doi: 10.1016/j.aap.2017.03.004.

[15] Brey, Raúl et al., "Is the widespread use of urban land for cycling promotion policies cost effective? A Cost-Benefit Analysis of the case of Seville," *Land Use Policy*, 63 (Apr. 2017), 130–9. doi: 10.1016/j.landusepol.2017.01.007.

[16] Lazo, Luz, "D.C. wins gold in bike-friendliness," *The Washington Post* (Mar. 6, 2018), https://www.washingtonpost.com/news/dr-gridlock/wp/2018/03/06/d-c-is-gold-in-bike-friendliness/.

[17] Cranor, David, "DC earns bicycle-friendly Gold, but there's still work to do," *Greater Greater Washington* (Mar. 12, 2018), https://ggwash.org/view/66789/.