



# ThinkBike Workshop

Santa Cruz, USA

September 2022





## Colophon

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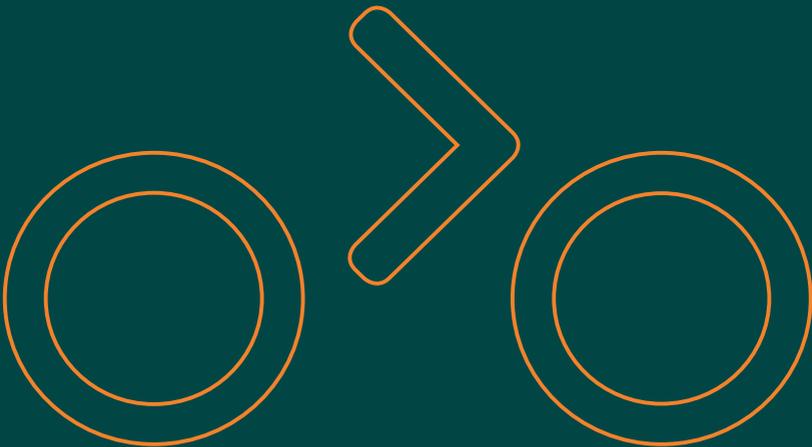
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# ThinkBike Workshop

## Santa Cruz, USA

The Dutch Cycling Embassy (DCE) is a vast network of public and private partners who work together to create cycle-friendly cities. The DCE shares its knowledge and expertise in all aspects of cycling so that more cities and countries around the world can experience the advantages of having cycling as a safe transport option. One of the solutions we offer cities are ThinkBike Workshops. During a ThinkBike Workshop, a team of three experts visits a city where they get together with the local decision makers, planners, and cycle advocates for a couple of days. The workshops are intensive, interactive, and hands-on.

This is the concluding report of the ThinkBike Workshop for the Santa Cruz County. On September 13th and 14th 2022, Lennart Nout (Manager of International Strategy at Mobycon), Martijn te Lintelo (all-round transport planner at Metropotian Region Arnhem-Nijmegen), Maurits Lopes Cardozo (Design & Innovation consultant) and Nout Ramaekers (Program Manager at DCE) guided a workshop in Santa Cruz. During the workshop, several aspects of bicycling inclusivity were discussed, including hardware (infrastructure), software (policy and programs) and orgware (collaboration between jurisdictions, NGOs, business). This report summarizes the most important takeaways from the workshop.





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# 1. Introduction



This workshop came together with the coordination between the Dutch Cycling Embassy (DCE), Gazelle Bikes (Gazelle), and Ecology Action (EA). Gazelle wants to help in the development of safe and sustainable mobility in Santa Cruz County by increasing the number and frequency of trips made by bicycle, which aligns with Ecology Action’s mission of equitably providing climate solutions for all and reducing greenhouse gas emissions in high emitting sectors. Gazelle contacted Ecology Action to collaborate. The Dutch Cycling Embassy offered to organize a ThinkBike workshop targeting just this goal, bringing Dutch Cycling experts and inviting officials from Santa Cruz County and various cities in the county such as Santa Cruz, Watsonville, Capitola, and Scotts Valley.

With this ThinkBike workshop, Gazelle, Ecology Action and each jurisdiction in Santa Cruz County are working together with the Dutch Cycling Embassy to further develop bicycling-inclusivity in the County, making use of decades of Dutch cycling experience and expertise. Our aim is to make this experience and expertise available: not to simply copy and paste, but rather to pick and choose and apply wisely by considering the specific local conditions of urban planning and space, as well as governance, history, culture, and lifestyles in Santa Cruz County. In this way, we can see the workshop as the start of a series of projects and related activities aimed at promoting the use of bicycles as a means of transport in Santa Cruz County.



# Involved Experts



Mr. **Lennart Nout**, a transport planner and urban designer at the Dutch mobility consultancy firm Mobycon. Lennart works at all levels of planning and designing for the bicycle. From strategy and policy to network planning, infrastructure design, bicycle parking and public transport integration. Lennart is experienced in running workshops with varied groups of stakeholders, always trying to find the solution that works best so streets deliver maximum value to surrounding land uses. Because of his work experience in New Zealand, he has a unique perspective and is very familiar with the challenges of retro-fitting cycling infrastructure into the fabric of the 21st century city.



Mr. **Martijn te Lintelo**, allround transport planner and an experienced expert and practitioner on cycling in the urban and regional context. He was appointed to be the regional projectmanager to organise new regional cycling ambition for the Arnhem-Nijmegen Green Metropolitan Region. The size and scale of the region is ideal for more daily cycling and less short trips by car. The result is presented and immediately applied in new projects for bicycle infrastructure (bicycle highways) and behavioural change. Martijn has been working on the policy development, planning, design and realisation of cycling highways, cycling networks and bicycle parking since 2006, when the first cycling highway in the Arnhem Nijmegen Region was built (RijnWaalpad). From 2003 till 2016 he was a member of the Dutch Fietsberaad, knowledge center on cycling issues. Martijn is also working for the city of Arnhem as a senior policy advisor (before: city of Nijmegen).



Mr. **Maurits Lopes Cardozo**, Design & Innovation consultant and founder of Bike-minded. He has 18+ years of experience with creative design and engineering projects for public space and infrastructure, offering a broad portfolio in bicycle infrastructure and innovation projects both in the Netherlands and abroad. He believes that best design solutions are a result of an analytic and creative approach, close collaboration, and a shared vision. Maurits also works as Cycling Infrastructure Design Advisor for the City of Rotterdam.

## 2. Hardware

There are three main aspects when it comes to the development of a cycling-inclusive city: hardware, software, and orgware. Hardware is the physical elements of the built environment, in other words: the infrastructure.

Much of the Santa Cruz County ThinkBike Workshop was focused on hardware, or how to design streets and roads to encourage cycling and create “cycling happiness”.

### 2.1. Safe Multimodal Network

When planning a safe and comfortable cycling network, you must take the car into consideration. In other words: a good car network is the best bicycle network. On certain roads, you must prioritize car travel, whereas very narrow streets are not suited for heavy traffic and may be closed off to cars (and therefore prioritized for bicycling and local traffic only). It is not easy to make these distinctions, but it is important for cars not to take over the city.

In the Netherlands, there is a simple system which is called the sustainable safety streets classifications. Based on these road types, there is a matching recommended default street design. If the speed limit is 50 km/h, cyclists must be separated. In case there is no space for a separated bike lane, then the speed and volume of the cars needs to go down. On 30 km/h streets, the design is very different. The speed is limited using cobblestone pavement. Because of the reduced speed you need less signage and markings and more eye contact with other road users. This design is more about psychology than about engineering. Because you need to make eye contact with the other road users and do some social negotiation, you automatically start to drive/operate more slowly. In Dutch cities, 80% of the streets are designed like this. Thus, you do not need to separate bikes from traffic everywhere, if you limit the speed.

## Dutch Street Classifications



Source: Mobycon

## Five Design Principles

There are five main principles when it comes to planning a bicycle network: coherence, directness, attractiveness, safety, and comfort. However, the overarching and most important goal is cycling happiness. Cycling happiness is what we should be aiming for, it goes beyond all other principles. Every bike lane has a tradeoff and thus, the perfect bike lane does not exist. You must design for the different kinds of users and needs.

### Coherence

You must plan a coherent network that gets its users from A to B. There should not be any missing linkages or gaps in the network. Cycling will only happen if the least safe part of the network is still safe enough for the user. Thus, it is important to create a network, not just a series of routes. Bike lanes need to be recognizable; you need to be able to see immediately where you are going and when you are crossing the street. Bike lanes in Santa Cruz sometimes end at the intersections without a clear direction across. This lack of coherence causes confusion. Continuity is very important and is often forgotten. For example, some cities plan bus shelters or advertising in the middle of the bike lane. This is not good for the coherence and continuity of the bike lane. Avoid this at all costs.

To create a coherent network, you need every actor in the city involved in planning and design of the cycle network to understand what you are doing to improve cycling. Bicycle route signage is important, but it comes after the design of the infrastructure. Signage is not going to contribute to your cycling happiness, it just makes sure everyone knows it is a bike lane.

## Directness

Cycling is a physical activity, so you do not want too many detours on your route. If cyclists have to add 50% extra time travel because of detours, they will stop cycling. You want to minimize the delays at traffic lights and to make it easy for cyclists to cross intersections. You can do this by implementing bike detection systems or push buttons.

## Attractiveness

Apart from focusing on the quickest route, you should focus on the attractiveness of that route. Attractiveness is difficult to achieve from a planning perspective, but it is important to keep in mind. People do not want to cycle alongside a highway. They prefer to take a (small) detour to cycle through a nicer area. This is often a trade-off with Directness (see above). Ensuring that you are aware of the trade-off and still providing a direct route can be beneficial.

Of the two pictures below, the left one does not offer any attractiveness, whereas the right picture is very attractive for cyclists. The first bike lane is safe, but boring, there is not much to see and it runs along a busy road for cars. The second picture is in a green area where you can enjoy your surroundings and have a comfortable bike ride. Part of attractiveness is also shade during the summer, for example with trees. Lighting makes cycling attractive at nighttime as well.



Source: Mobycon

## Safety

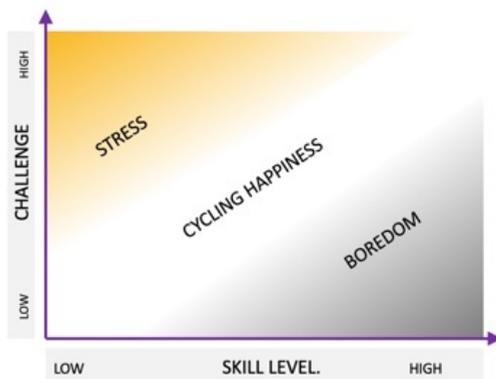
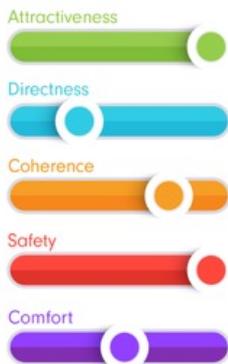
Safety is key, however, if you only focus on safety, you will not get cycling happiness. Make sure that you minimize the number of conflicts by separating bike lanes when cars drive faster. Conflict points are unavoidable but make sure that even the conflicts are as safe as possible. Speed at intersections is very important. Low speeds ensure people can have eye contact with each other, eye contact reduces conflict. To create safe situations, create safe infrastructure (for example, make sure there are no blind spots in the design of the space).

## Comfort

It is important to make cycling as comfortable as you can by minimizing energy consumption. Minimize the number of stops, construct cycleways with an extra smooth surface, and minimize gradients. When cycling is easy, it becomes comfortable. A smooth surface, such as asphalt, allows for a smoother bike ride as it does not cost much energy. This is important for commuter bike lanes. When designing a recreational bike route, you can use sand and gravel as well (asphalt is quite costly and not good for drainage). The drainage system that is common on American streets, in which a wide gutter creates vertical separation in the bike lane, takes away part of the comfort for cyclists.

It is impossible to reach a perfect score on all five design principles. There is always a tradeoff between the different elements. The key is to match the values to the expected user. Children require a very high level of safety over directness, recreational riders require attractiveness above all and highly experienced commuter cyclists prioritize directness and coherence.

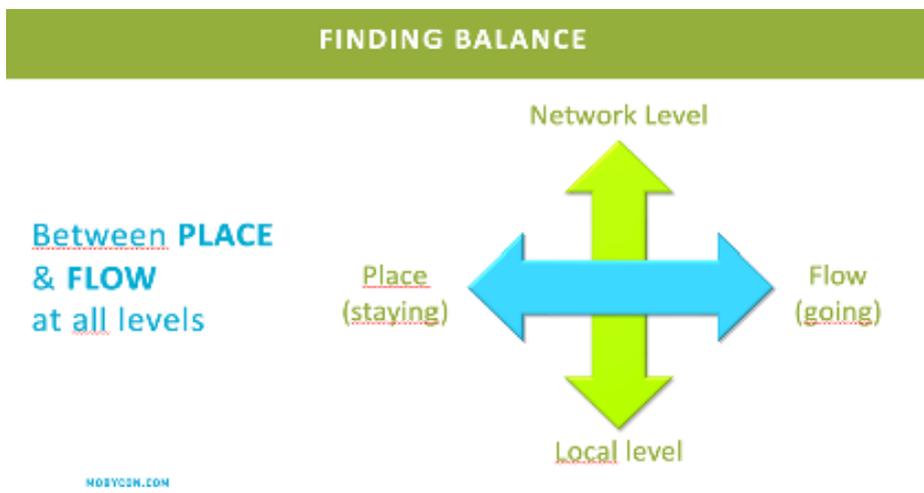
In the graph on the next page, you see that cycling happiness means something different for different people. This depends on their skill level and the reason for the bike trip. To achieve cycling happiness for the greatest number of people, it is important to provide a wide range of bicycle paths and options for a wide range of people.



Source: Mobycon

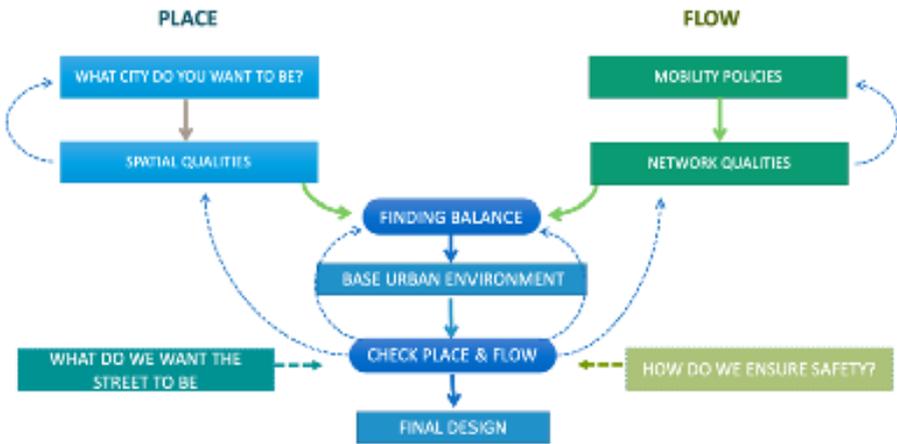
## Place and Flow

In traffic, there are two characteristics: place and flow. More concretely, attractive and accessible spaces are needed for people to gather and make use of an inviting public realm. At the same time however, people flock to urban environments due to their efficient flow of both people and goods. In other words, as cities continue to grow in popularity and size, friction between place and flow has developed. The more space we dedicate to high quality public spaces, the less efficient movement through the city becomes. The opposite has also shown to be problematic. The more space dedicated to flow through the city, the harder it becomes to create high quality public spaces. At present, there is a tendency to focus on increasing flow, with spatial quality, or place, addressed as a separate problem.



In the overview below, a new approach to balancing mobility and place in urban space, starts with its focus on place. That is, what qualities should a place provide? For instance, is this place somewhere for busy gatherings and bustling activity, or one of calmness and rest? Either way, a decision must be made about what kind of spatial qualities a place should provide. Only once this is determined can we begin to think about the type and location of mobility networks.

## OVERVIEW OF DESIGN METHOD



Source: Mobycon

All of these aspects are constantly combined and considered, both in the design on the network level and on the street level. Once your network has been established, the street design should reflect the outcomes you want, starting with speed. The Dutch design connector and arterial streets to encourage 50kmh streets, and residential neighborhood streets for 30kmh speeds. Higher-speed connectors and arterials include separated cycle tracks for cyclists, while slower-speed neighborhood streets are used by both bikes and cars, without separate bicycle facilities.

## Planning For Different Types of Cyclists

Various types of cyclists have different needs ranging from practical daily commuters to more recreational cyclists, call for inclusive planning and specific design considerations for cycling networks. Barriers such as highways, rail and waterways, but also unsafe intersections and busy (car) corridors are barriers in the cycling network, forcing cyclists to take a detour or ride in stressful conditions. Considering these barriers when planning cycling networks is key.

### Consider Different Types of Cyclists



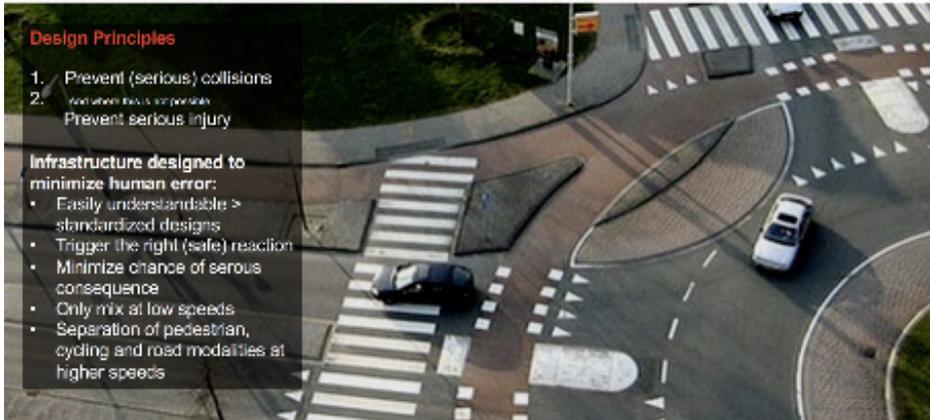
Source: Bike Minded



## 2.2. Street Design

A multimodal network needs safe and forgiving infrastructure. Dutch design principles for reducing injuries and fatalities are shown in the slide below.

### Design for Safety



Source: Bike Minded

The infrastructure should be safe enough to allow mistakes by people. In case of accidents, it should not lead to serious injuries or death. For this, we focus on ‘forgiving infrastructure’.

In the US, cyclists are in the ‘fast zone’, whereas pedestrians are in the ‘slow zone’. In the slow zone, people are walking, smiling, chatting. We believe cyclists have more in common with pedestrians in how they behave and what they require and desire. That is also visible in the basis of how we design cycling infrastructure; cycling belongs in the slow zone as well.

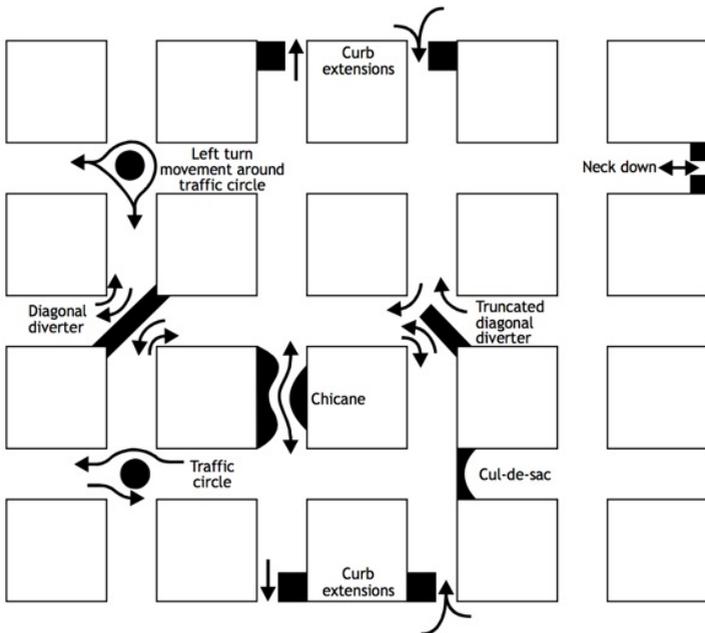
### 30 km/hour Zones in Practice

In the Netherlands over the last 30 years many roads within the inner city have been downgraded from 50 km/h to 30 km/h. The risk of fatal injury drops significantly when lowering car speeds to 30 km/h; when a cyclist collides with a car driving at 50 km/h, the chance of survival is 50%, when the car is driving at 30km/h the risk drops to below 10%.

Collision severity is a product of kinetic energy: The more kinetic energy vehicles have, the more severe the consequences of a collision. Using simple laws of physics, it is therefore the mass and achievable speed (velocity) of a vehicle that dictates collision severity. It goes without explaining that cyclists and pedestrians will be on the losing side of these collisions. Therefore, where these different forms of movement meet in high volumes (such as residential zones and city centers) the lowering of speed from 50 km/h to 30 km/h significantly drops the risk of severe injuries.

When it comes to implementing 30 km/h zones in cities, there are 3 key elements that you must consider.

First, enforcement is futile. There cannot be police at every corner of the street. Therefore, the street design must dictate the rules. A tomato seller at the corner of the street will create more incentive that you should drive slowly than a sign ever will. It shows that the street is more than just driving your car very fast. The graphic below shows several kinds of road designs to make sure traffic drives slowly while still allowing cars on the street. By putting in these physical barriers, you are forcing car drivers to pay a lot of attention to their surroundings. Within residential areas, make sure the road is designed for local traffic and prevent through traffic.



Source: Mobycon

Second, width is everything. A wide street is a fast street. On wide streets, people only look at the distance in front of them and then they speed up. To tackle this, you can take inexpensive measures like for example placing large rocks at the entrance of a street. Rocks keep cars out, and if they enter, it makes sure they slow down. You can use paint on the road as well but that is usually not enough to make cars adhere to the speed limit.

Third, start at the network level. Make sure the network works for the traffic psychology for drivers. Streets where you do not want cars to drive, make sure that it becomes difficult to drive there so that over time, the route disappears from their minds. Cars do not need to drive through residential roads unless you live there. Redirect cars to arterial roads.

To conclude, the devil is in the details. Cycle infrastructure is much more difficult and detailed than car infrastructure. Arterial roads are for moving people, residential streets are for people who live there. Make sure your road design reflects that.

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## Colored asphalt / Curb details



Source: Bike Minded

During the workshop, several infrastructure design details were compared between California and the Netherlands. Some design features used commonly in the Netherlands could be innovation and

improvement areas for Santa Cruz County to save cost, improve safety, and increase the life span of the infrastructure:

- Using colored asphalt, or a color treatment with the same life span as asphalt, will ensure a longer life span of newly built cycling routes and minimize the maintenance cost or need to resurface when paint or Thermoplastic coloring has worn off after some years. Colored asphalt would challenge the industry, but the Netherlands demonstrates that it is possible. It also is a powerful design tool for training road users to recognize where car-priority and bike-priority areas are in the roadway.
- Updating street design standards can improve the safety and comfort of cycling infrastructure; for instance, a narrower gutter that is not in the way of bike lanes adjacent to the curb. See the image above for a comparison of the size of the gutter in the Netherlands versus the U.S. – the Netherlands has a higher annual rainfall than the U.S. The photo on the left also shows forgiving edges of bike paths; there are no vertical curbs, and instead flat or spayed edges are used that are safe and forgiving when a cyclist crosses them.
- Using raised crossings for pedestrians and bicyclists crossing the roadway. This design prioritizes the more vulnerable road users and makes them more visible. Raised crossings also serve as speed tables to slow cars down before crossing. This design can be used for trail crossings, for example where the Coastal Rail Trail crosses minor streets.

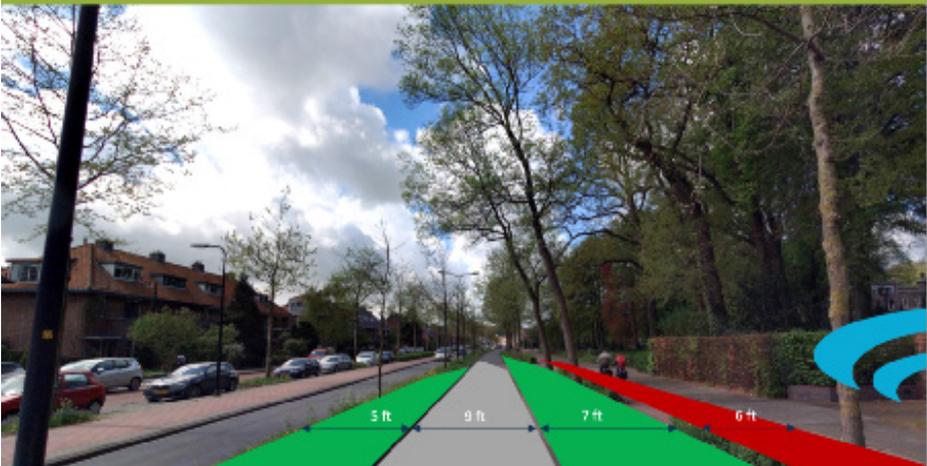
## Raised cycle track across side street entrance



Source: Bike Minded

- The Netherlands has an efficient and cost-effective method of constructing streets with modular street elements (concrete curbs, cobblestones, flat pavers, etc.). This construction method allows for infrastructure resilience and flexibility, temporary removal for underground works and reuse on other locations reducing the need for using new concrete, lowering the carbon footprint, lowering labor costs, and reducing project timelines and complexity.
- Lastly, reconfiguring arterial roads to two car travel lanes and replacing traffic lights and stop signs with roundabouts maximizes traffic through arterial roads without the need for more than one lane of traffic in each direction. This “driving slower goes quicker” approach can help optimize the flow of traffic while at the same time creating a lot of space for pedestrians and bicyclists and reducing the crossing distance for pedestrians. This allows a road to see decreased car speed, increased traffic flow, improved safety for all road users, ample space for bicycle and pedestrian facilities, and can make space for green infrastructure (e.g. planters, trees, landscaping, shown in green in the slide below) to provide shade, rainwater infiltration, and more natural features along a road. This treatment can be used on streets like Capitola Road, Portola Drive and, many other arterial roads in Santa Cruz County.

## DESIGN ELEMENTS



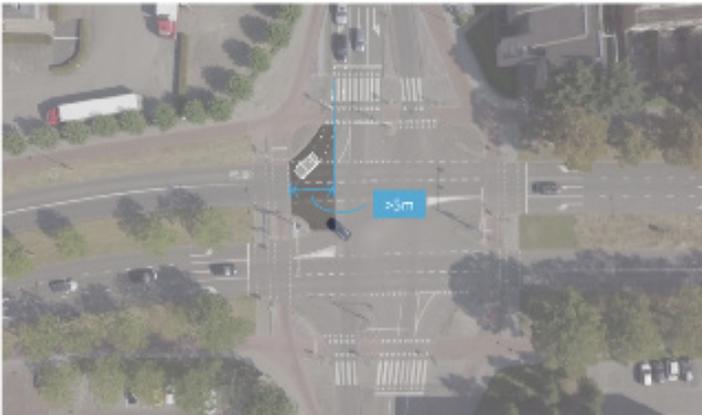
Source: Mobycon

On the previous page, you can see a typical Dutch residential street where next to the car lane (grey) there is a safety buffer (green, and gives the opportunity to place trees which add to attractiveness and cooling in summer time) between the car lane and the bike lane (red).

## 2.3. Redesigning Intersections and Roundabouts

The Netherlands has been very successfully replacing its signalized intersections with protected intersections and roundabouts. In protected intersection design, eye contact between road users is crucial. In the example below, you can see space has been allocated for the car driver to stop and look, before crossing a road. This significantly lowers the risk of crashes.

### EYE CONTACT BETWEEN CAR AND CYCLIST

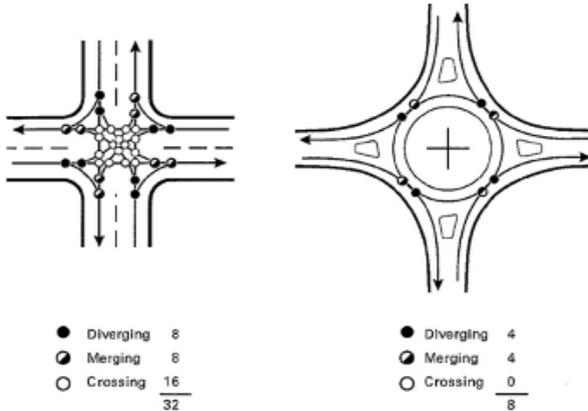


Source: Mobycon

Roundabouts came up several times in the workshops as a safer intersection option for relatively high-capacity streets. The traditional (tangential) design of American roundabouts does not do enough to slow vehicles down to a safe speed and thus does not generate the safety outcomes required. The Dutch (perpendicular) approach to roundabout design allows for very slow circulating speeds (max 20 mph), separated bikeways, and bicycle priority around the roundabout. During the workshop, Lennart explained the design principles behind protected roundabouts. Why did the Dutch choose roundabouts? Because they eliminate 24 conflict areas for vehicles.

## WHY A ROUNDABOUT?

24 vehicle conflict areas are eliminated with a roundabout



Source: Mobycon

There are a number of key principles of roundabout design:



**Cycle in one direction:** Cyclists travel in one direction, which makes it clear and easier for car users to identify and predict where bicycle traffic is coming from.

**Priority:** Cyclists and pedestrians have priority, slowing down overall car traffic and adding to the comfort of cyclists and pedestrians.

**Buffer distance:** Cars can stop twice, first to yield to cyclists and pedestrians and second to merge into the roundabout. This reduces the feeling of stress and hasty decision-making.

**Behavior prediction:** Buffer areas and round cycle lanes add to the visibility of cyclists when drivers cross the bike lane.

**Vehicle control:** a triple 90 degree maneuvering necessity for cars when entering a roundabout forces car users to slow down significantly.

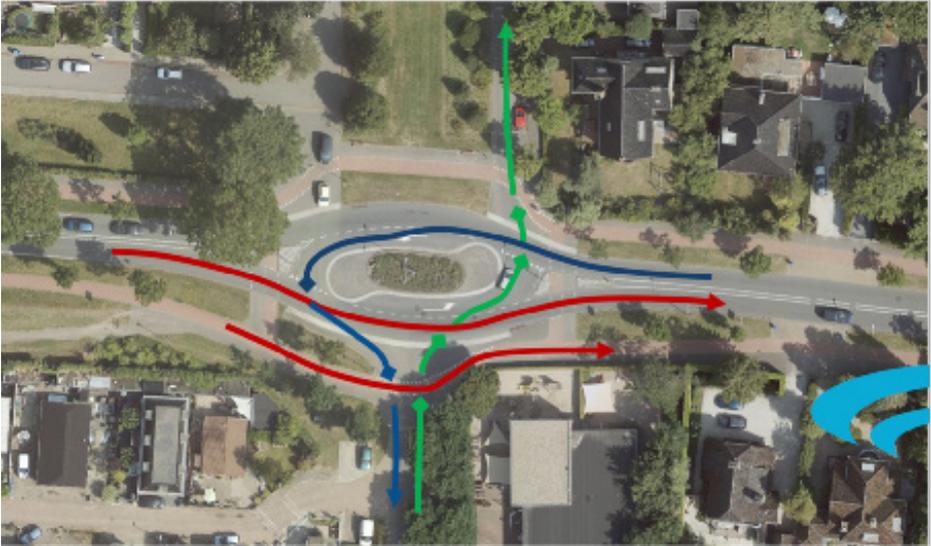
**Separation:** a safety buffer zone between car lanes reduces the risk of collisions and narrows the roads, thus reducing speed.

These key principles, when applied correctly, show the following results:

- 75% reduction in serious casualties
- Better eye contact between various modes
- Slower speed for all users



Below, a Dutch-style roundabout can be seen with separated bicycle paths in each direction. Roundabouts have replaced traffic signals in the Netherlands because roundabouts move traffic more efficiently since drivers often do not have to stop, or only stop briefly. Roundabouts also allow the two-lane configuration to work with large volumes of traffic (up to 20K vehicles/day) because they do not require space for cars to queue at intersections.



## 2.4. Bike Parking

(Frequently) last but certainly not least: providing bike parking. When it comes to bicycle parking, there are many options. Therefore, you need to think about the reason why people would want to park their bikes there. Is it for a short trip to the store, or possibly a full-day or overnight parking which is common at Dutch railway stations. This also impacts the possible need for security, monitoring, and/or a roof to protect from rain. While sometimes a simple bike rack will do the job, in some cases, it makes sense to build an indoor bike parking garage where the bikes are monitored. Safe and dedicated road space for bicycles is needed, but bike parking is also important to people to feel OK to bike to their desired destination without worrying about their bike being stolen.

Providing adequate bike parking starts with a good bike parking policy. To get a good bike parking policy in place we need to create a solid foundation:

1. Which goals do you want to reach with the bike parking policy?
2. Where should parking facilities be put?
3. Which form, which type of bike parking should be installed?
4. Who is doing what to install parking facilities?

Bicycle parking is worth organizing and it is very space effective: 12 bikes can fit in 1 car parking spot. Good bike parking is quite often overlooked but is a crucial ingredient in a bikeable city.

A successful cycling city requires more than cycling infrastructure. It is important to take an integrated approach and focus on all three solution types: hardware, software, and orgware.

### 3. Software

Software is about human behavior and encompasses policy and programs that encourage cycling and cycling culture. Cycling must be for everyone; it must improve social equity and equality. Software also includes improving traffic safety, social safety, cycling promotion, education, encouragement, and public campaigns.

All these factors play a role in creating a well-balanced, safe, and most of all comfortable cycling network within a city or region. While the workshop did not focus on software, the team acknowledged that software is an essential component to creating a bike-friendly community.



## 4. Orgware

**Orgware** is what you must do besides the social and physical part of planning. This includes creating a regional vision for bicycling, involving policy makers and decision makers, project management, process management and acquiring and allocating the appropriate funds. It is important to have a vision and a strategy. It also helps to have local leaders who ride bikes and are regular and vocal supporters of bicycling. In the Netherlands, the King, Queen, and Prime Minister are often on their bike. We use this as an example to get more people on bikes.

Orgware is strongly linked to the local culture. For example, in the US education and economic development appear to be very important drivers for promoting cycling.

## 5. Workshop Breakout Sessions

This workshop mostly focused on the Hardware aspect of bicycling inclusivity: looking at the Santa Cruz multimodal network, street design, intersection design, roundabouts, and bike parking. As such, part of this workshop was different break-out sessions where the attendees were split up into different groups together with one expert, applying the design theory to practical cases in Santa Cruz County. In this section, we'll discuss the most important break-out sessions and main takeaways.

**Break out session 1: Identifying main arterials for cars and potential prioritized streets for cyclists.**



Participants were asked to create a re-imagined road hierarchy and bike network based on the knowledge from the experts' presentations. Printed maps were available to draw out the ideas. These are some results that came out of the session:

One group differentiated routes for vehicular traffic and cycling/walking. Key destinations were identified and the main movements of the traffic during the week. During weekdays there is a lot of traffic in an east-west direction, but on the weekend and especially in summer/holiday times there is a significant amount of traffic that travels north-south from Highway 17 and Highway 1 to places like the Boardwalk area. The group envisioned Soquel Avenue as the main arterial for vehicular traffic and Broadway Street as a bike boulevard and low traffic street.



Another group started with acknowledging the big potential for Broadway Street to serve as a spine in the bicycle network. This would allow people to bike from Live Oak, Capitola, Soquel, and Aptos via the Brommer/Broadway corridor all the way to Downtown Santa Cruz. For this to work, some of the car traffic would have to be re-routed to Soquel Avenue and Murray Street. To improve beach traffic, a new car bridge from Murray Street to the boardwalk was a popular concept.

Additionally, the bike facilities along Murray Street would need to be built upon from the existing bridge and improved for greater safety and connectivity.



Soquel Ave/Dr is already handling a lot of traffic, including traffic that is trying to avoid the freeway. For the traffic situation to be improved, this group proposes reduced access to Soquel from the side streets, separated cycleways and even the option of a couplet configuration with Water Street, both having two lanes in one direction and one lane in the other.

In the North-South direction, Cayuga Street could be a promising option for a quieter bicycle boulevard, while Seabright Avenue requires separated bikeways due to speed and available space.

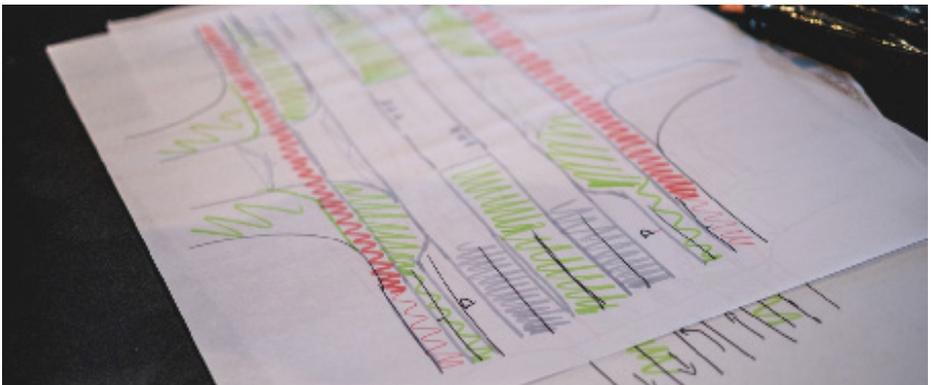
**The third group first looked at** optimizing certain roads for cycling, while concentrating other roads for cars/motorized transport, even improving the accessibility of tourist traffic to the coast and boardwalk. In that way the urbanized area offers new space for safe cycling on a network of cycling routes (streets, paths, separated cycle paths) that is truly attractive for people now driving cars for every short trip.



The basis of the plan features “desire lines”, from points of origin (homes) to destinations like schools, supermarkets, downtown etc. After defining the desire lines, the group chose Broadway to be an important east-west cycling route.

A common denominator between all groups was the significant potential for Broadway Street to be prioritized and optimized for cross town bicycle traffic via the Brommer – Arana Gulch – Broadway corridor.

## Break out session 2: Street Design

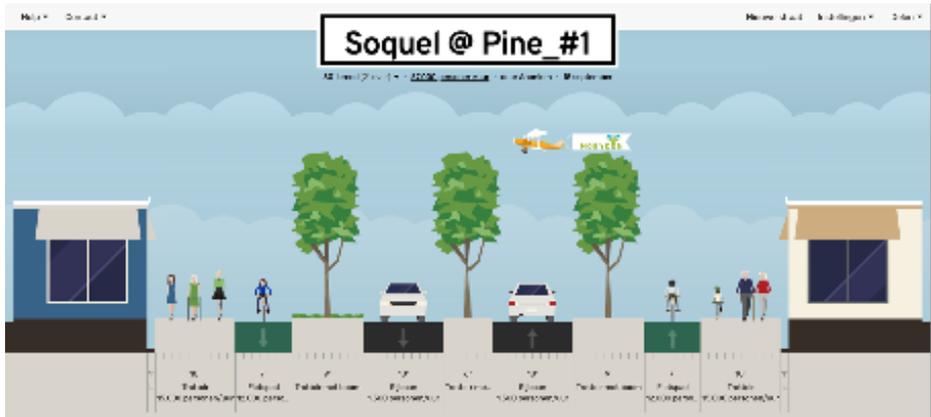


During the second break-out session, the group discussed the topic of street design. Using Mobycon's handy (and free-to-use) tool StreetSketch, the groups looked at current available space and how that can be reallocated for different modality types.

One group focused on two corridors that were identified in the first breakout session: Soquel Ave as an arterial street to be further optimized for flow of vehicular traffic, and Broadway as low traffic street with a separated bicycle route. We looked at the neighborhood level how the number of side streets and intersections on Soquel could be reduced to allow for more continuous flow of traffic. An idea to further simplify the intersections on Soquel Ave was to restrict left turning motions and use roundabouts at major intersections as turning points for vehicles.

The group studied the available space and was able to fit separated bikeways and elevated sidewalks along Soquel Ave, thus giving cyclists and pedestrians equal priority. Side streets have a raised plateau at the connection with Soquel, which reduces speed. This design communicates to the car drivers: yield to all traffic on Soquel, including bikes and pedestrians.

Group 1 envisioned a new street profile based on the design principles mentioned earlier in this report:





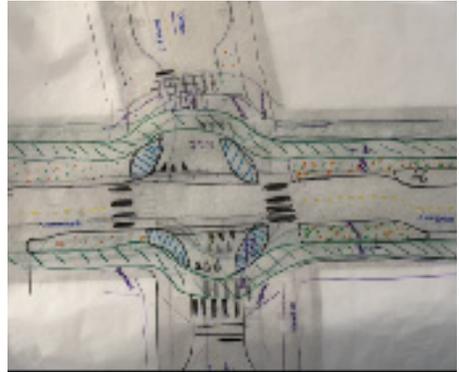
## Break out session 2: Street Design



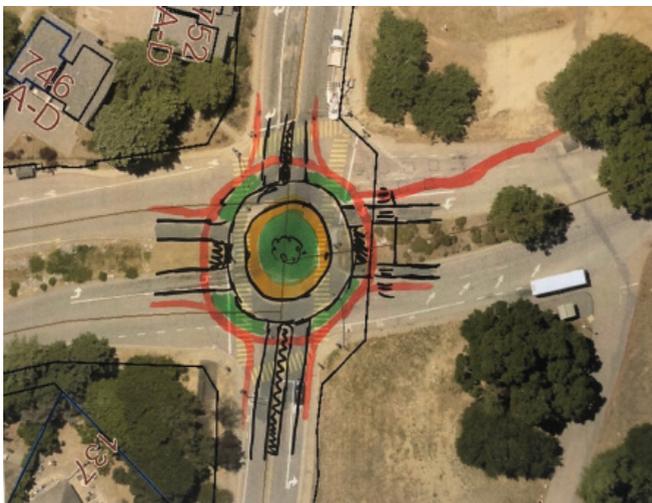
The goal of the last break-out session was redesigning intersections. Each group designed a small, unsignalized protected intersection at Cayuga and Broadway, based on the new street profile that was envisioned with protected bike lanes. This intersection of two bicycle boulevards or cycling priority streets is a great location to implement protected intersections. Through a few simple steps, the participants created an outline of a protected intersection that includes all the features of a signalized intersection except without the lights.



The goal was to create short crossing distances and offer protective elements between people walking and biking and motor vehicles. The groups looked at the movements of all modes and where conflicts took place. The intersection design was optimized in the end to allow for enough space for a car to have a safe interaction with cyclists and not to block the bike path when waiting for traffic to cross the intersection.



The last group redesigned a specific intersection at the UCSC campus. The intersection of High Street and Bay Drive is currently highly oversized and could easily accommodate a protected roundabout within the same footprint. Through a quick sketch, the participants explored the operational and spatial consequences of a roundabout at this location. Some challenges were identified, but overall, it seems to be a very manageable transition.



Roundabout sketch for Bay and High St. 1

## Key takeaways

These group sessions focused on the implementation of the theory discussed earlier in the workshop to install safe cycling infrastructure in an existing car-centric environment. One of the key takeaways from the two-day workshop is that it's never too late to make the transition to a safer, more inclusive environment, and the specific locations discussed during the break-out sessions showed good examples of where the start could be made. Another key takeaway was that cycling-inclusive infrastructure does not necessarily create a negative impact for car users and can even have a positive effect on traffic flow and safety for drivers.



## 6. Next Steps for Santa Cruz

Dutch design principles can be applied to streets and roads throughout the county and offer tremendous potential to encourage and increase bicycling. Doing so will help the County of Santa Cruz address climate goals, Vision Zero policies, and spur social and economic benefits for residents and visitors alike.

## Dutch Expert Recommendations

The Dutch experts offered the following recommendations for next steps to build a complete network of safe and comfortable bicycle routes and a culture that supports bicycling.

### 1. Long Range Multi-modal Network Planning

Develop a strategy for corridor hierarchy and the prioritization of traffic flow versus walkable urban destination streets with lower car volumes. Integrate this network planning between unincorporated Santa Cruz County and each of the four cities. Partner with Santa Cruz Metro to identify transit priority corridors and ensure that appropriate lane width and transit stop locations are integrated in the road network.

### 2. Prioritize Completion of Main Cycling Routes

Look for ways to connect major origins and destinations throughout the county with safe cycling infrastructure. This includes upgrades to existing routes as well as installation of quick-build infrastructure interventions at collision hotspots and critical gaps in the cycling network.

Projects identified during the ThinkBike workshop include:

- Completion of a low-stress east-west bike route by building safe, separated bike infrastructure along Broadway and Brommer Street to connect downtown Santa Cruz with the Arana Gulch trail, Live Oak, Capitola, and Aptos.
- Map out and complete signage for a low stress neighborhood bike route from downtown to Dominican Hospital to provide options for school-based community, neighbors, and commuters who otherwise might be averse to busy, heavy traffic corridors like Soquel Dr.
- Create a vision and concept design for Capitola Road that utilizes protected intersection treatments and roundabouts with two lanes of car traffic and separated bicycle facilities.
- Optimize the current Soquel Avenue/Drive project designs for cycling, including highlighting the entire bicycle lanes using colored green asphalt.
- Create a concept design for Dutch-style roundabout at High Street and Bay Street that could be included in the Bay Street plans for an approximately 2-mile protected bike lane from the base of UCSC campus to West Cliff Drive.
- Widen the Beach Street cycle track and sidewalk to prioritize active transportation along this key destination for tourism and local travel. Consider removing a lane of motor vehicle traffic to provide additional space for bicycle and pedestrian facilities.

### 3. Build Cycling Culture

Look for ways to stimulate cycling, such as providing bicycling and traffic safety education to all students in primary schools, providing incentives for employees to bike to work, multi-jurisdictional ebike incentives, and offering grants to local employers who provide bicycle parking, showers, and incentives to employees who bike.



## Workshop Participant Recommendations

At the end of the workshop, the experts and attendees gathered to summarize the most important steps discussed during the two-day workshop and the concrete action steps that could come next. The group came up with the following list:

### Short term (1-3 year)

- Create a dedicated cycling budget; allocate funding for hardware, software, and orgware. A dedicated budget will help create clarity about the vision and grow the sustainable transportation team for delivery of the projects.
- Organize a design competition for projects that incorporate Dutch design principles with funding from Gazelle Bikes.
- Develop new design standards and guidelines for the County, making use of the CROW manual as inspiration including key Dutch design features like colored asphalt and raised crossings for bikes and pedestrians
- Start an assessment of the cycling network and create plans for network development
- Deploy quick build solutions for addressing network gaps
- Consider low infrastructure, low stress bike routes through neighborhoods and side streets (e.g. San Francisco Wiggle)
- Identify current bike parking locations and key locations that lack bike parking

### Midterm (3-5 years)

- Upgrade the bike parking network in areas that lack bike parking
- Begin construction of bicycle network to fill network gaps, upgrade existing lanes to separated facilities on primary corridors, and create low-speed neighborhood connections.
- Apply new design standards to every new street design project.

### Long term (5-10 years)

- Construct a coherent, direct, attractive, comfortable, and safe bike network in Santa Cruz County.



