INTERSECTION [Hammerbrook/St. Georg/Altstadt/Hafencity]

Group 2: Ayse Nil Sensu, Daniel Tesfamichael, Guvanch Rejepov, Shefali Nayak, Worod Al-Shaibawi

INTRODUCTION

Map Source: Google Earth (2020)

Map adapted from Geoportal (2020)

Our neighbour is an "intersection" between four different districts; Hammerbrook, St. Georg, Altstadt, and Hafencity. It is very close to the city center which has imposed many challenges on the area. After analysing the five scopes of REAP (Sustainable urbanism, mobility, water, material, and Energy) with different analysis tools, it was found that the scopes that needs the most attention were 'Mobility' and 'Water'.
For mobility sector, the main focus will be:
1.The intersection district has a pressing problem when it comes to noise
2.Good accessibility but low comfort
3.Inefficient public space design towards inclusiveness in mobility.
As for water sector, the focus will be:
1. Water runoff, sewage overflow and pollution issues
2. Existence of vulnerable river and lake systems
3. Dynamic changes in rainfalls and their effects

Pictures taken by Authors (2020)

Stakeholder Analysis

SWOT

S – Strengths

Mobility
- Destinations can be reached in multiple paths due to higher cyclomatic number
- Close to central station, as well as multiple bus and train stops
- Easy access to Stadtrad and e scooters.

Water
- Moderate infiltration values allowing discharge
- Water channels and river beds for water flow
- Large open spaces for stormwater management

W – Weaknesses

Mobility
- High noise levels caused by high vehicle traffic count and trains.
- Number of average distance between intersections is slightly above the suggested threshold number
- Majority of main local streets " and not a lot of neighborhood streets

Water
- Low potential for green roof applications (slope)
- Mainly impermeable surface materials coverage
- Flat topography and lack of green zones (flooding)

O – Opportunities

Mobility
- Lowering congestion and traffic
- Its easy access gives it a plus (for business, or residence)

Water
- Tree pits and detention basins potential
- Channeling & infrastructure development
- Infiltration storage shafts, multi use area etc.

T – Threats

Mobility
- Health problems created by noise pollution
- Longer walking distances could make mobility more difficult for handicapped people
- Concern of safety due to high number of cars and number of main local streets

Water
- Extreme flooding events risks
- Wastewater overflow to nearby rivers
- Disruption in hydrological cycle

Spider Chart Analysis

Mobility Sector Focus:
1.The intersection district has a pressing problem when it comes to noise
2.Good accessibility but low comfort
3.Inefficient public space design towards inclusiveness in mobility.

Water Sector Focus
1. Water runoff, sewage overflow and pollution issues
2. Existence of vulnerable river and lake systems
3. Dynamic changes in rainfalls and their effects

Research Methodology

Site visit/literature research → Problem identification → Conceptual framework → Making observations → Literature research → Developing interventions

Noise Map Day

Symbol	Category
	55-60 dbA
	60-65 dbA
	65-70 dbA
	70-75 dbA
	over 75 dbA
	Main city streets
	Main local streets
	Neighborhood streets
	One-way street

On the left is the average noise map for day/evening/night. As seen on the map, the noise levels are mostly very high and they are affecting a high portion of the neighborhood. The residential use areas are very close to the main city street which means they are subject to the high noise level this street brings by. The percentage of buildings with noise level of 70dbA and up during the day count for about 60%

Noise Map Night

Symbol	Category
	50-55 dbA
	55-60 dbA
	60-65 dbA
	65-70 dbA
	over 70 dbA
	Main city streets
	Main local streets
	Neighborhood streets
	One-way street

On the left is the average noise map at night time. As seen on the map, there is, again, a big portion of the nighborhood affected by high noise levels. The percentage of buildings with noise level of 50 dbA and higher are about 83%.
People who reside in the area find it hard to open the windows for ventilation at night as the noise would keep them from sleeping.

Road Constructions

Symbol	Category
	Road construction

Criteria	Scale of 0-10
Road comfort	8
Pleasure in car	8
Cycling pleasure	5
Cycling comfort	5
Walking pleasure	6
Walking comfort	6
Public transport pleasure	8
Public transport comfort	8
Bike sharing pleasure	7
Bike sharing comfort	7

The map on the left shows the areas in which construction works are taking place. Most of those construction areas do not take consideration of the pedestrians as they do not leave sufficient areas for them to pass. Another problem is that when road blocks are placed, they do not provide a proper detour.

Infiltration Potential

Color code	Depth
	0-1m, unlikely
	1-2m, limited
	2-5m, probably
	>5m, possible

Infiltration potential map is used to estimate the total amount of water that a soil column can hold during heavy rain.
Infiltration is mostly plausible in green colored zones (On the map on the left). Pink and dark pink areas have limited infiltration potential.

Permeability Analysis

Color code	Category
	Green areas
	Buildings
	Water Body
	Asphalt
	Pavement
	Cobblestone
	Other (soil, gravel,etc

Permeable surfaces help reduce stormwater loads on the pipe infrastructure by absorbing or detaining rainwater. As seen on the map on the left –there is a major coverage of asphalt on the streets and concrete tiles on the sidewalks.
There is also a lack of greenery and vegetation in the area – making the region vulnerable to flooding.

Maps adapted from Geoportal (2020)

Research Questions

Which measures can be applied to water and mobility sectors to improve livability for Intersection neighborhoods?

>Through which interventions can noise problems be avoided, mobility comfort and pleasure be increased and inclusivity for mobility impaired groups be improved?

>What types of interventions can be applied for efficient managing of surface water runoffs during heavy rain?

Icon Source: Flaticon (2020)

References
Carmona, M. (2019). Principles for public space design, planning to do better. URBAN DESIGN International, 24(1), 47–59. https://doi.org/10.1057/s41289-018-0070-3
Century West Engineering. (2017, January 20). Downtown-Sandpoint-Streetscapes-Plan.jpg (2028x1572).
Jenny G. (2017, October 11). Benefits of Permeable Paving and Pervious Driveways. https://ecologymatters.org/permeable-paving-and-pervious-driveways/
Clausen, U., Doll, C., Franklin, F. J., Franklin, G. V., Heinrichmeyer, H., Kachsiek, J., Rothengatter, W., & Sieber, N. (2012). Reducing Railway Noise Pollution. European Parliament Directorate General for Internal Policies.
Den Boer, E., & Schroten, A. (2007). Traffic Noise Reduction in Europe. Delft.
Flaticon. (2020). www.flaticon.com
Geoportal Hamburg. (n.d.). Hamburg. Retrieved June 9, 2020, from https://www.geoportal-hamburg.de/geo-online/
(2015). Methodology and indicator calculation method for sustainable urban mobility. WBCSD. http://docs.wbcsd.org/2015/12/SMP2.0_Sustainable-Mobility-Indicators_ENG.pdf
Green Blue Urban. (MAY 17, 2018). Trees & Water Sensitive Urban Design. https://greenblue.com/gb/gbu-suds-publication/
Poldma, T., Labbé, D., Berlin, S., Grasbois, E. de, Barile, M., Mazurik, K., Desjardins, M., Herbane, H., & Artis, G. (2014). Understanding people's needs in a commercial public space: About accessibility and lived experience in social settings (Vol. 8). https://doi.org/10.1016/j.alter.2014.02.007
Senate Department for Urban Development and the Environment. Berlin - Design for all - Public Outdoor Space.
Dickhaut W. (2020a, July 23). Stormwater 2. https://cloud.hcu-hamburg.de/nextcloud/s/82Rat4q9WJEqsies
Dickhaut W. (2020b, July 23). Stormwater first lectures. https://cloud.hcu-hamburg.de/nextcloud/s/WjPEQAYRFAwbAHm
Zhang, W. (2017). Research on the Design of Visually Impaired Interactive Accessibility in Large Urban Public Transport System (Vol. 280). https://doi.org/10.1088/1757-899X/280/1/012047

INTERSECTION [Hammerbrook/St. Georg/Altstadt/Hafencity]

Group 2: Ayse Nil Sensu, Daniel Tesfamichael, Guvanch Rejepov, Shefali Nayak, Worod Al-Shaibawi

INTERVENTIONS

Interdependencies

WATER

Map adapted from Geoportal (2020)

Color code	Category	Zones
	Green Roofs	Buildings
	Permeable surface	Parking lot
	Multifunctional space	Riverside
	Tree pit, SW planter	Main Streets

Water Interventions

1 - Green Roof : means they are covered with vegetation, planted over a waterproofing membrane. They are useful for absorbing rainwater and decrease surface runoffs. Semi-intensive green roofs are proposed for our district buildings.

2 - Tree Pit - Stormwater planter: bring a broad range of benefits in terms of stormwater runoff reduction, attenuation and filtration.

3 - Permeable Pavement: these surfaces help reduce stormwater loads on the pipe infrastructure by absorbing or detaining rainwater. Open jointed blocks and mixed grass pavements are main applications.

4 - Multifunctional space usage : Parking space near riverside will be changed and have more functionality as green-park, leisure zone and retention basin in heavy raining times.

MOBILITY

Noise Sources and Interventions

Map adapted from Geoportal (2020)

Moblity Interventions

Currently, the intersection neighbourhood has only one street with the restriction of 30 km/h (Shown in blue). The streets shown in red are the proposal for streets to be restricted with 30km/h speed. The proposed streets have residential buildings which are affected by traffic noise. The speed restriction can help in limiting the noise as noise is emitted when the speed is over 30 km/h due to the contact of tires with the surfaces. (Den Boer & Schroten, 2007)

The second proposal is the street marked in purple to be restricted with 30 km/h but only at night and with an exclusion of buses (buses will still be allowed to go with their usual speed. This street is a main city street and limiting vehicles speed could be challenging. This is why the intervention suggests that the speed would be limited only after 6 PM when the rush hour has passed.

The railway is another big part of the noise problem in the intersection neighborhood. For the intervention, maintenance of railways has the biggest potential of lowering the noise. The estimated reduction of noise is between 10-20 db. The second intervention is the improvement of the train brakes system can have an effect of 7-10 db. Finally, installation of silent tracks can lower between 3-7 db.

Color code	Category
	Existing Tempo30
	Tempo 30 Day & Night
	Tempo 30 Night
	No intervention
	Railway tracks

Projected Noise Level Decreases

Source: Den Boer & Schroten (2007)
Graph adapted from same source

Source: Clausen et al., (2012)
Graph by authors

Local Design Interventions for Mobility Impaired Groups

Source: Poldma et al., (2014)

Comfort and Pleasure Design Against Inconsiderate Road Constuction Blocks

Maintain and secure a clear width of 120 cm for pedestrians at all times

Green Roofs

1

Source: Pinterest (2020)

Source: Green Blue Urban,2018

Stormwater Planter

2

Source: Century West Engineering, 2017

Tree pit

3

Street Width	Applicable convention type
2.2m, Neighborhood	Drains from curb to tree pits
3.5m, local	Storm water planter with tree pit
7m, main	Plantation with landscape elements

Source: Jenny G. (2017)

Source: Jenny G. (2017)

Projected Timeline of Interventions

Conclusions

The intersection neighbourhood has an interesting location close to the center of Hamburg. This location has given it many advantages. However, it has also imposed many challenges upon it. In terms of mobility, the intersection neighbourhood has a major problem when it comes to traffic noise. The intervention suggested a few solutions to deal with this problem. These soultions include; speed limitations, silent tires regulations, road surface alterations as well as railway maintenance and upgrades. In addition to noise, a few other challenges have been analysed. Those were the inconsiderate raad construction blocks and the absence of impaired groups inclusivity. Proposals suggested better regulations and monitoring of road constructions as well as generic designs for tact tiles implementation that could be applied in underground stations and streets.As for water sector, an intervention in storm water management was needed. This intervention has to reduce urban runoff coming from impermeable surfaces like roofs and streets. In response to this problem, the following landscape elements were proposed; green roofs, making spaces multifunctional, tree pits and storm water planting on the side of streets. All of laterally mentioned serve in in absorbing the runoff water from the roofs and impermeable surfaces as well as improve livability in the neighbourhood.