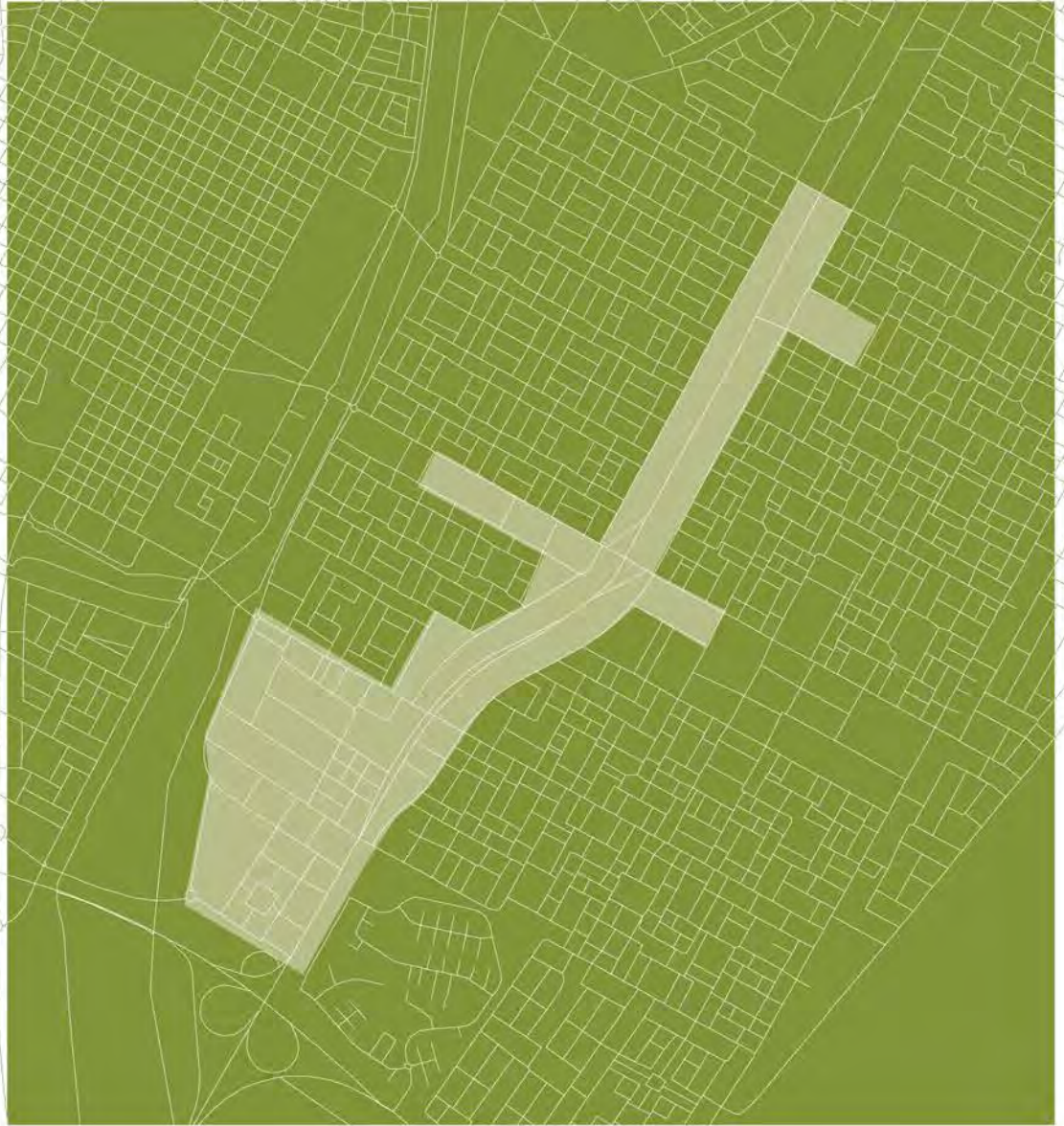


# TRANSIT-BASED REGENERATION

## ARAR: FROM HIGHWAY TO BOULEVARD



Future Saudi Cities Programme  
Demonstration Project: **Arar**

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FUTURE SAUDI CITIES



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# TRANSIT-BASED REGENERATION

## ARAR: FROM HIGHWAY TO BOULEVARD



FUTURE SAUDI CITIES PROGRAMME  
DEMONSTRATION PROJECT

*"Cars are the cigarettes of the future.  
Cities & people must take priority over cars (...)  
there is no future for cities if they depend only on cars"*

*Jaime Lerner*

*Architect, urban planner and former mayor of Curitiba, Brazil.*





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# INTRODUCTION **↑**



## 1.1 Scope of the Demonstration Project

UN-Habitat's three-pronged approach considers spatial planning in relation to legal and institutional frameworks, in addition to financial mechanisms. In this way, success criteria for the sustainable implementation of a spatial plan should include flexible but enforceable rules and regulations, in addition to a financing strategy and projections.

As a pragmatic explication of this approach, three local demonstration projects representing essential elements of a strengthened and improved planning system have been developed. As applicable to all of these projects, the demonstration project for Arar has been elaborated to include schematic designs and feasibility studies, that can later be transformed into implementation plans. Such implementation plans are projected to be undertaken by the Ministry of Municipal and Rural Affairs (MoMRA), in collaboration with other partners in the Kingdom. Though this project is localised in order to provide a detailed and calculated projection of impact, it has been designed to address problems that have been analysed as paradigmatic of Saudi cities, and the themes and elemental compositions presented here, are considered as transposable in the larger Saudi context.

The project addresses themes such as compaction and densification, connectivity, circulation hierarchies, equitable access to infrastructure, and transport and facilities. It also acknowledges the importance of the natural ecosystems that interact with the city and endeavours to create more meaningful symbiotic connections with those ecosystems. This plan has drawn from a detailed analysis of Arar's strengths and weaknesses and intends to enhance the city's natural features and to bring renewed importance to existing landmarks through new connections.

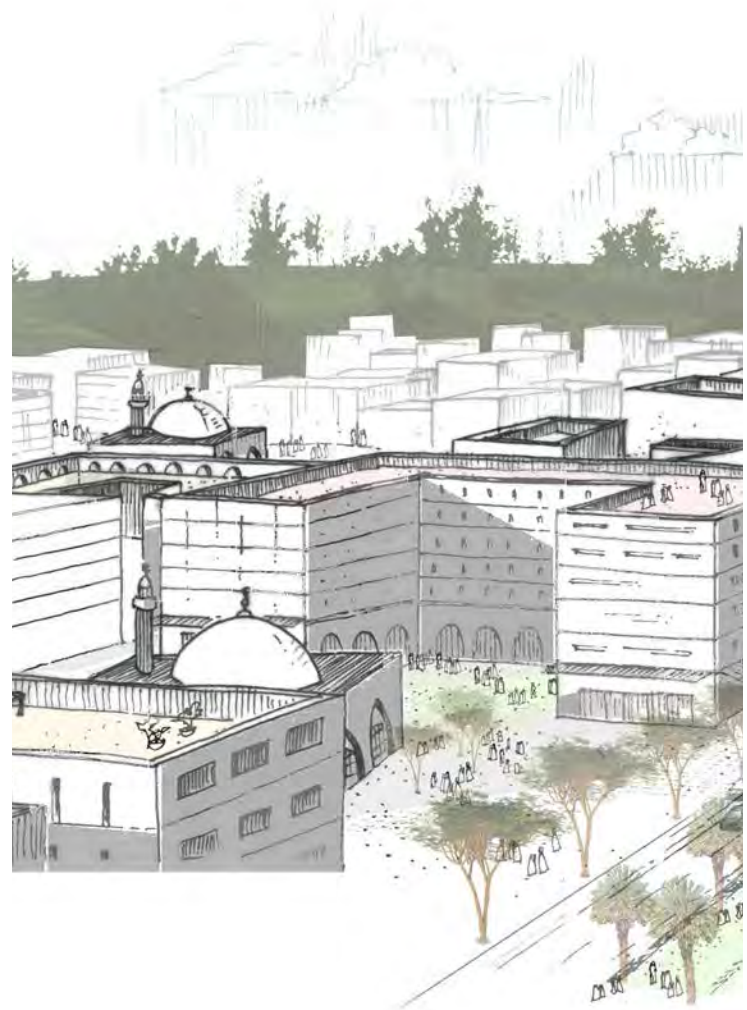
Arar suffers from deep fractures in its fabric created by the intersection of the two highways which has formed the primary point of interest for this proposal. However, despite the specificity of this proposal, these themes are applicable to many cities in the Kingdom and the modes of address for these themes are intended equally as a toolkit of methods that can be applied with adaptation to many more specific circumstances in the Saudi context.

The projects closely follow criteria and ideologies put forward by UN-Habitat in the New Urban Agenda. The following articles have particular relevance to this proposal:

**Article 52.** We encourage spatial development strategies that take into account, as appropriate, the need to guide urban extension, prioritizing urban renewal by planning for the provision of accessible and well-connected infrastructure and services, sustainable population densities and compact design and integration of new neighbourhoods into the urban fabric, preventing urban sprawl and marginalization.

**Article 53.** We commit ourselves to promoting safe, inclusive, accessible, green and quality public spaces as drivers of social and economic development, in order to sustainably leverage their potential to generate increased social and economic value, including property value, and to facilitate business and public and private investments and livelihood opportunities for all.

**Article 114. a)** A significant increase in accessible, safe, efficient, affordable and sustainable infrastructure for public transport, as well as non-motorised options such as walking and cycling, prioritizing them over private motorised transportation;



## 1.2 Objectives of the Demonstration Project

The project uses a specific segment of Highway 80 to demonstrate a transformation proposal for the highway system.

This demonstration section is designed for transposal to the additional segments of both Highways 80 and 85 that fall within the city boundary.

This suggests removal of the existing highway that crosses the city, to be replaced by a bypass road on the perimeter. This will open the land occupied by the original system and its wide borders for transformation into boulevards with additional residential neighbourhoods supported by public facilities, public spaces, commercial hubs and public transport.

Through this operation we can achieve:

- Restructured mobility and road hierarchies
- Higher density
- Higher land value
- Safe, inclusive, efficient and sustainable neighbourhoods
- A more vibrant and social street life
- Improved urban microclimate
- Improved public health and wellbeing through the promotion of natural shading, accessible pedestrian routes, and additional public space

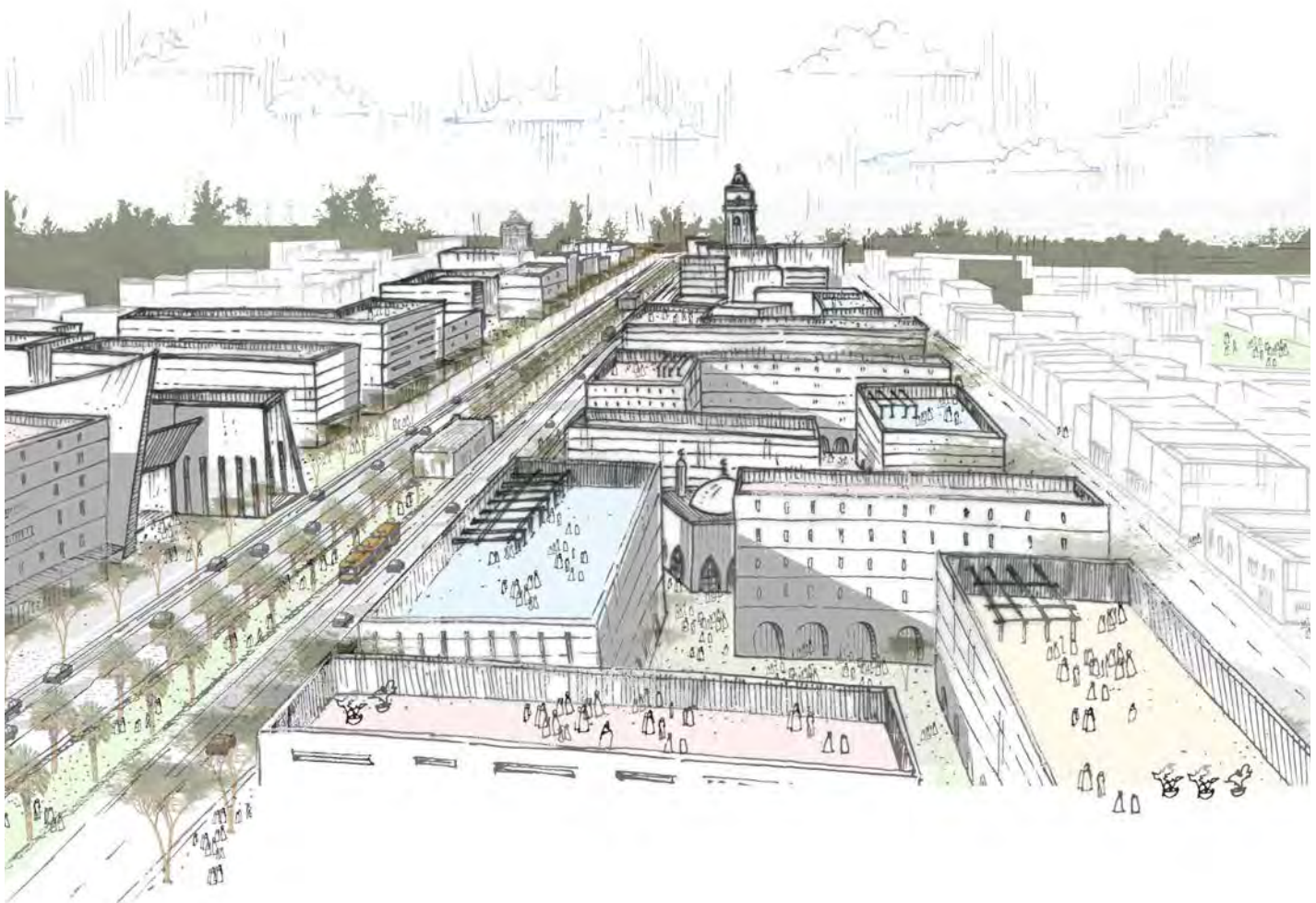


Fig. 1. Conceptual sketch of the project proposal



# 2

## LINKAGE TO THE STRATEGIC VISION FOR ARAR



## 2.1 The Strategic Vision for Arar

Developed as an extension to the Arar City Profile, this project taps into the Strategic Vision for Arar, which outlines a series of high-level strategic recommendations for the radical restructuring of the city's future development patterns. As such, this project will provide an example of concrete interpretations that bring conceptual strategies and actions into design guidelines and implementable projects. Below presents a summary of the four strategic recommendations from the Arar City Profile, in relation to the demonstration project.

### 2.1.1 The Compact City

The Compact City is envisioned as a high-density urban settlement, characterised by mixed-use development, recognisable, dense, and revitalised central areas, with well-distributed services and facilities, (hospitals, parks, schools, leisure, and entertainment). This concept asserts that the shape and the density of cities have implications for the sustainable use of resources. The compact city is achieved by prioritising urban renewal, planning for the provision of accessible and well-connected infrastructure and services and sustainable population densities. It is also necessary to consider integration of new neighbourhoods into the urban fabric, in order to prevent sprawl and marginalisation. The demonstration project utilises four approaches that target the provisions of a Compact City:

- The proposal aims to contain urban sprawl by densifying select areas of the urban footprint, including the wide expanse in the former Highway 80.
- It proposes infill of currently available vacant land with mixed-use and dense development.
- It proposes the relocation and reintegration of a selected section of military land in order to balance the urban footprint.
- It proposes a series of mechanisms to consolidate the urban footprint with improved connectivity across mass transit, pedestrian access, evenly distributed services and public space.

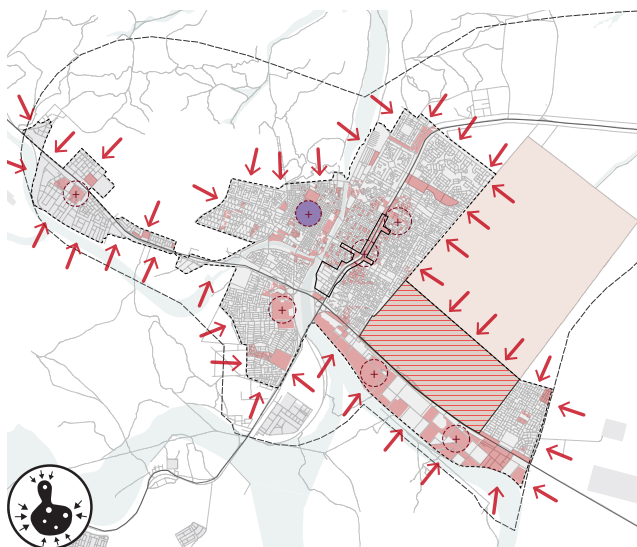


Fig. 2. The Compact City

### 2.1.2 The Connected City

The Connected City is envisaged as a continuous, well-connected, and well-balanced network of neighbourhoods, each with parks and public spaces, and accommodating a diversity of overlapping private and public activities, shaping a healthy and vital urban environment. A well-organised street hierarchy with arterial routes and local streets based on different modes of transport and traffic speeds has a major role in shaping the urban structure which, in turn, sets the development patterns and scales for blocks, connective nodes, buildings, open spaces, and landscape. Mass transit systems can provide high-speed, cross-town travel leaving local distribution to local systems and foot traffic. This opens further opportunities to concentrate mixed-use around public transport interchanges and reduces the volume and impact of traffic, congestion and pollution. In line with the above, the demonstration project presents a series of interventions that contribute to a new mobility system for Arar, arranged around new hierarchical principles and improved connectivity:

- The proposal utilises the revitalised section of Highway 80 to host a new trackless tram or Autonomous Rail Transit (ART) system with strategically placed stations creating a public transit backbone.
- To facilitate the redevelopment of the inner city highway that currently dissects the city into disconnected quadrants, the demonstration project proposes a bypass road to circle the city perimeter and further East-West crossings which aid the re-stitching of the two sides of the city, supported by the new public transport system.
- In place of the poorly integrated highway, the proposal maintains two single lane roads in each direction on the new boulevard and makes a series of important east-west connections to effectively disperse traffic into the city.

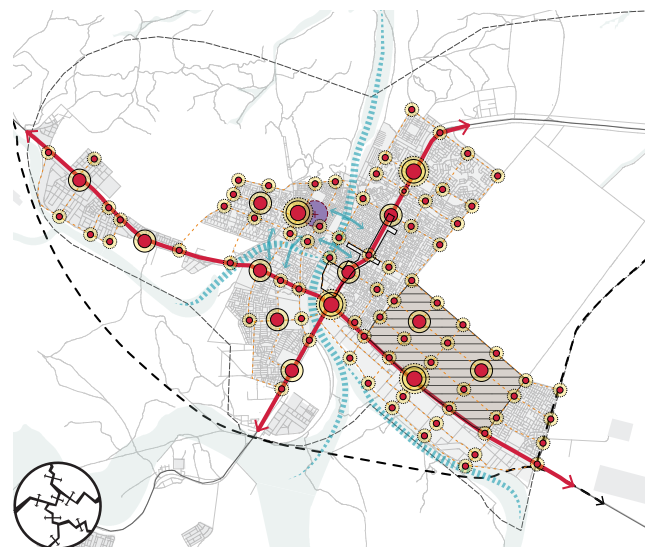


Fig. 3. The Connected City

### 2.1.3 The Inclusive City

The Inclusive city is envisioned as engendering strengthened social cohesion, intercultural dialogue, understanding, tolerance, mutual respect, gender equality, innovation, entrepreneurship, inclusion, identity, and safety, and the dignity of all people, while fostering liveability and a vibrant urban economy. The concept of inclusive cities involves a complex web of multiple spatial, social, and economic factors. The project therefore aims to address inequity in the distribution of services and opportunities. In this proposal, this is delivered through centralised provision with meaningful links to the surrounding neighbourhoods and further extents of the city, as described in the following:

- The proposal utilises the new transit backbone as a platform to demonstrate potential for concentrated provision of public and commercial facilities, creating new centralities in mixed-use centres around the strategically spaced stations.
- These new centralities further connect the separated quadrants of the city and enhance and extend a series of links that weave together new proposals with existing areas of interest.
- The proposal includes a hierarchical system of connections that feed into the new transit spine and integrate the surrounding neighbourhoods, providing access to new networks of green spaces and commercial hubs that are strategically distributed through the network of existing landmarks.

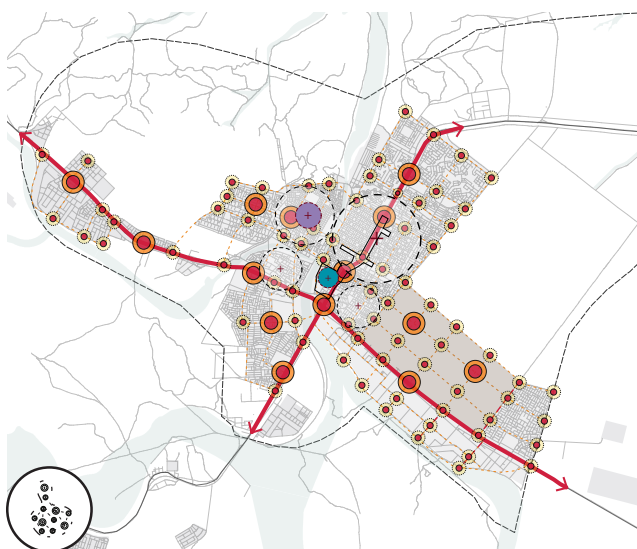


Fig. 4. The Inclusive City

### 2.1.4 The Resilient City

A Resilient City takes into consideration appropriate built form and physical infrastructure to increase resilience to the physical, social, and economic challenges that arise from depleting carbon-based fuels and climate change. According to the New Urban Agenda (NUA), cities need to ensure environmental sustainability by promoting clean energy and sustainable use of land and resources, protecting ecosystems and biodiversity, promoting sustainable consumption and production patterns, reducing disaster risks, as well as mitigating and adapting to climate change. In Arar, the demonstration project exemplifies strategies to fully capitalise on the city's unique features and create a symbiotic relationship between the built and natural environment as follows:

- The rehabilitation of the wadi system will improve the city's ecological health and provide an opportunity to connect and harmonise the natural green and blue networks with the engineered fabric.
- The development of the original highway section as a green boulevard will create an extensive addition to the city's green network that opens opportunity to connect into the existing wadi system. Additional infill interventions are strategically identified in areas of vacant land to create a seamless network of green space that can provide equal access to all residents.
- The placement of the boulevard and vacant land developments will complement the existing wadi system and improve the city's water management. Additional water reservoirs will be integrated into the wadi system to complete the distribution of drainage networks and prevent flooding.

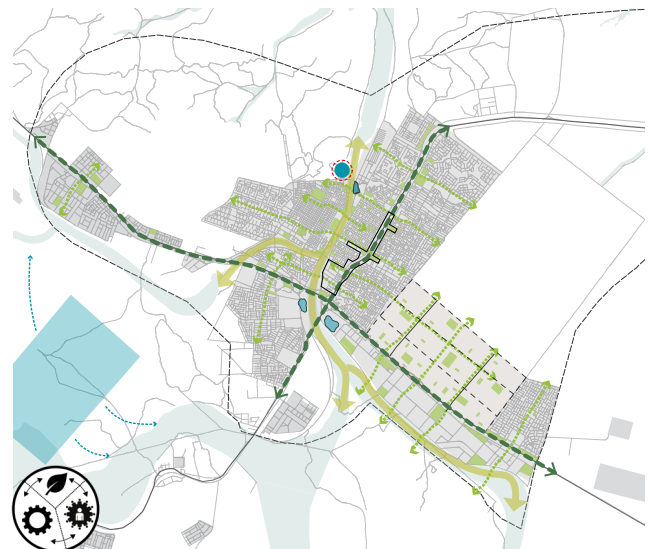


Fig. 5. The Resilient City



Fig. 6. Four strategic responses for Arar





© FSCP

Current state of Highway 80

## 2.2 Implementing the Vision: An Action Plan for Arar

As outlined in the Arar City Profile, the city diagnosis was interpreted to form a series of strategic recommendations that defined the conceptual framing for a systemic and strategic address to the issues affecting urban development in Arar. These were followed by an Action Plan, which, in the case of Arar, is formed of three systemic actions that service implementation of the strategic vision. The demonstration project interprets those systemic actions into a series of specific interventions focused on a segment of Highway 80.

Although the demonstration project focuses heavily on Action 1, it incorporates recommendations for redistribution of military land from Action 2 and acknowledges the necessity to expand and improve connectivity of the streetscape with particular reference to the blue and green networks as prescribed in Action 3. The following addresses the interpretation of each specific Action in relation to the demonstration project.

### 2.2.1 Action 1 - Create an efficient public transportation backbone

Action 1 focuses on the city's need for a restructured mobility network that takes into account its street networks, services distribution and new transportation modes. Action 1 is interpreted as a radical proposal for a new transport system, guided by a phased implementation plan.

The proposal provides a detailed outline for the transformation of Highway 80, focusing on one section as part of a larger proposed transformation of the two highways currently crossing the city. This outline demonstrates the transformation of the highway into green and pedestrian-friendly boulevards, on which a new mass transit system will connect to and trigger a series of networked interventions. The highway traffic will be accommodated by a new bypass road that will circle the



Fig. 7. Action 1: Create an efficient public transportation backbone

perimeter of the city and dispersed onto single lane roads that remain on the transport spine. The single lane roads on the former highway will be serviced by a number of East-West connections that assist intake and dispersal from the spine. The reduction of road space on the former highway allows for further pedestrian crossings which will increase walkability. These measures will drastically improve connectivity and reduce air pollution.

### 2.2.2 Action 2 - Density, connect and create new centres

Action 2 suggests incremental densification supported by new hubs focused around major transport nodes. The new mass transit routes will form the focus for high-density mixed-use development and new housing typologies that fill voids in the city's fabric and generate new centralities that are well connected to the surrounding city. Mixed-use housing developments demonstrate a model that provides more equitable access to essential services and amenities and generates economic benefits. The proximity of housing to commercial facilities elevates land and property values and reduces reliance on personal vehicles. The concentration of such hubs around strategic transport points will ensure equitable access and connect surrounding neighbourhoods, encouraging a lively streetscape inhabited by a newly connected, mixed demographic.

### 2.2.3 Action 3 - Create a diffused and well-integrated blue and green infrastructure system

Action 3 addresses the city's natural elements to create an environment that is more resilient, more sustainable, and enjoyable for its residents. The mass-transit routes are proposed as an integral element of green boulevards that bisect the city in place of the original highways. These are designed to connect to the existing wadi system to form a comprehensive and complementary, natural and engineered blue and green infrastructure. The addition of water reservoirs are proposed to form a continuity with the existing wadi system and enhance the city's ability to guard against flood risk. Green space infill, on vacant land throughout the city will serve to extend the presence of natural elements inside the city and form an accessible network.

As mentioned above, the demonstration project focuses heavily on Action 1, taking into account and integrating themes from Actions 2 and 3. The primary focus of the proposal is the provision of a new public transport system. The dynamics of this new installation are then explored in reference to the potential for new connections, further greening and regeneration of the natural ecosystem, new mixed-use hubs and gradual densification.



Fig. 8. Three systemic actions for structural change in Arar



# 3

## RESTRUCTURING THE URBAN FORM



### 3.1 The Project's Tenets

Urban interventions can be defined as truly “transformative” when they have a catalytic, place-defining impact, creating an entirely new logic for portions of the city and a new set of possibilities for economic and social activity. Truly transformative urban interventions are therefore the ones where changes are dramatic, large-scale and enduring. These kinds of urban interventions are defined by their capacity to alter urban characteristics and dynamics:

- Cognitively, transformative projects redefine the identity and image of the city, creating nodes of new activities and new places for people to congregate.
- Environmentally, transformative projects enable cities to achieve their “green” potential by reducing or removing environmental damage or residue from prior industry or development practices, by densification, and by provision of accessible transportation alternatives.
- Socially, when carefully designed, staged and leveraged, transformative projects can expand the housing, employment and educational opportunities available to low-income residents and overcome racial, ethnic and economic disparities.

- Economically, transformative investments uncover the hidden value in the city, creating markets in new places or where they were only partially realised.
- Fiscally, transformative investments dramatically enhance the fiscal capacity of local governments, generating revenues through improved property values, growth in city populations, and expanded economic activities.

These projects are able to trigger a profound ripple effect of positive, multi-dimensional change in ways that fundamentally redefine the value and/or function of one or more of a city's parts. The Arar demonstration project is based on four such principles, or tenets, defined by the city's overarching issues and an impact analysis.

The four tenets are:

- Establishing urban connections
- Rebuilding the green and blue networks
- Densification and restitching of the urban fabric
- Infilling of vacant land



*Lack of integration between the city and the wadi*



Fig. 9. Study and intervention area for the project

### 3.1.1 Establishing urban connections

The current placement of Highways 80 and 85 fragments the city of Arar into four distinct quadrants, bisected from East to West and North to South.

The project proposes to divert major traffic routes to a new bypass that will circle the city perimeter and to redevelop the highways as boulevards carrying a major public transport spine that will reconnect the deep divisions in the built-up area. This spine will be integrated with the city through the addition of further East-West connections that behave as stitches to rejoin the fractured northern quadrants.

Apart of the two highways, the city is also divided by the presence of a National Guard reserve in the Southeast quadrant. The proposal suggests reallocation of land in the southern section of the reserve and reintegration of this area with the city in order to rebalance urban distribution and resolve fragmentation.

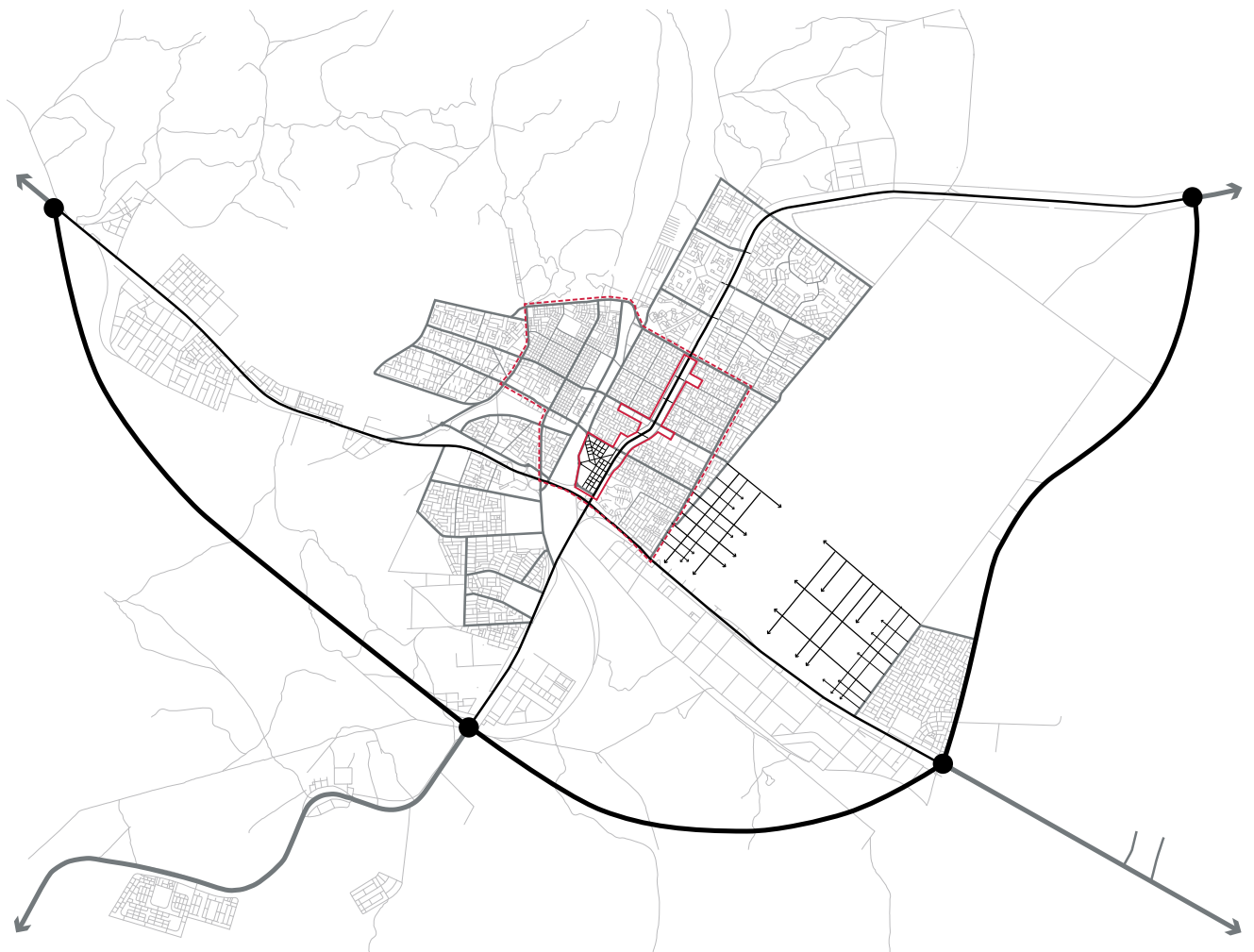
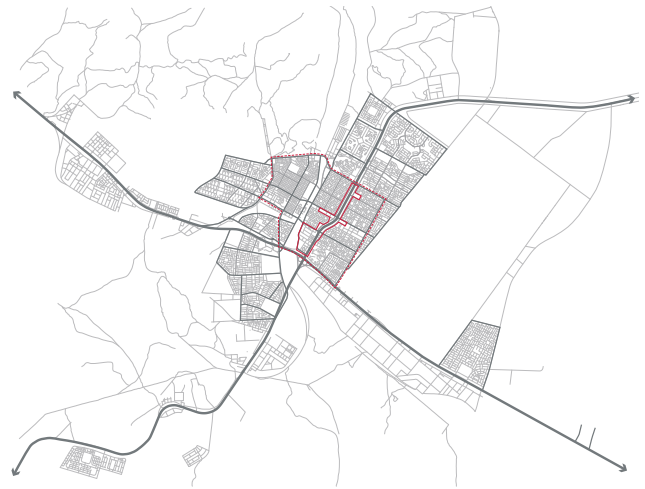


Fig. 10. Current road network (top) and proposed road network by UN-Habitat (bottom)



### 3.1.2 Rebuilding the green and blue networks

Currently, the majority of green lands lie next to the highway routes or next to the Wadi, which creates a very linear and localised green system. These are currently underutilised and will benefit from connection to a larger network. Additionally, the reinvigoration of these areas through the provision of the transport system and the proposed housing that will surround it, will bring new life and care to the area.

The proposal's boulevards capitalise and build on these existing systems. The boulevards are envisioned as comprising extensive planting plans, constituting green corridors on both East-West and North-South axis. This is proposed as further linked to the existing green network through a series of green public spaces, strategically placed across the city.



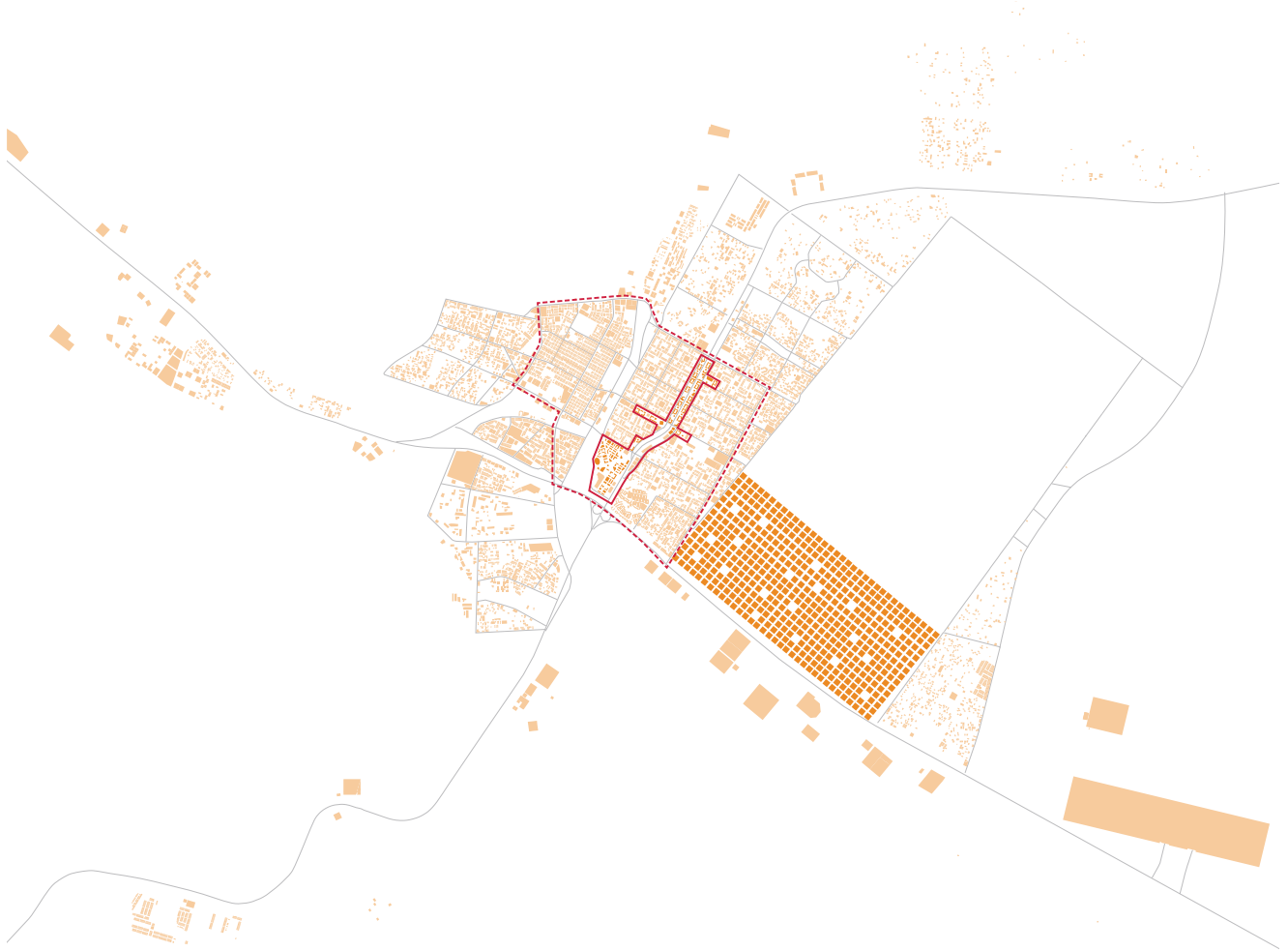
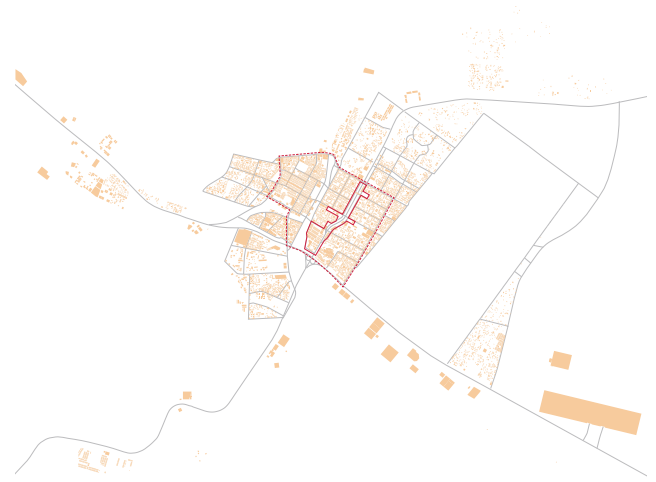
- Existing green
- Potential green
- Existing wadi
- Potential water reservoirs
- Boulevard
- Intervention area
- Study area

Fig. 11. Current green and blue network (top) and proposed green and blue network by UN-Habitat (bottom)

### 3.1.3 *Densification and restitching the urban fabric*

The development and densification of the land next to the Highway and in the Southern part of the National Guard reserve is intended to provide a revitalising stitchwork that will reintegrate the neighbourhoods disconnected by the original highway system.

The obsolete industrial area located at the crossing between the two highways is also considered and proposed as an ideal location for a new CBD with optimum access to the new boulevards and accompanying transport routes. This latter point acknowledges the existing plan for this action and integrates the municipality's proposals with the new themes of this demonstration. The new CBD is envisioned as a pulsing heart for the city that will be well-served by the new boulevard and the increased connectivity in the city.



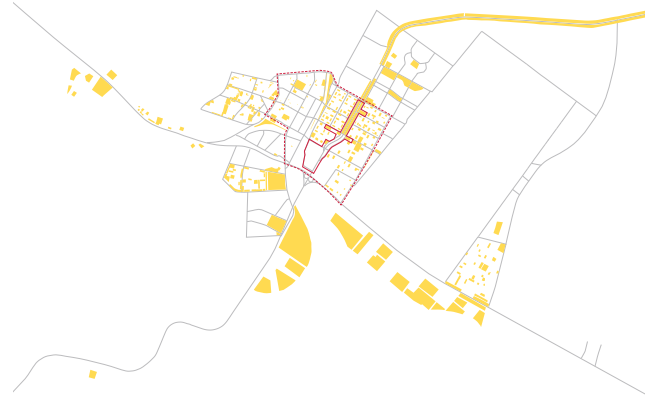
- Existing built-up area
- Potential built-up area
- Intervention area
- Study area

Fig. 12. Current built-up area (top) and proposed built-up area by UN-Habitat (bottom)

### 3.1.4 Infilling of vacant land

As is the case in many Saudi cities, Arar is faced with a high percentage of vacant land. Currently, the majority of land next to Highways 80 and 85 is empty, leaving a void of several hectares which contributes to the fragmentation caused by the highway structure. The project proposes development on these areas that will consolidate use of the green boulevard and reconnect it with the existing built-up area.

These interventions will re-characterise the highway as an integral part of the city fabric, not only by reducing the fracturing effect of the highway on the existing city but by providing new centralities of residential and commercial activities. The project also considers adjacent vacant land pockets and suggests integration and reactivation through connective development that will draw residents through this new point of connection.



- Existing vacant land
- Potential vacant land infill
- Intervention area
- - - Study area

Fig. 13. Current vacant land (top) and proposed infill by UN-Habitat (bottom)

### 3.2 The Vision for Arar Transnational Eco-City

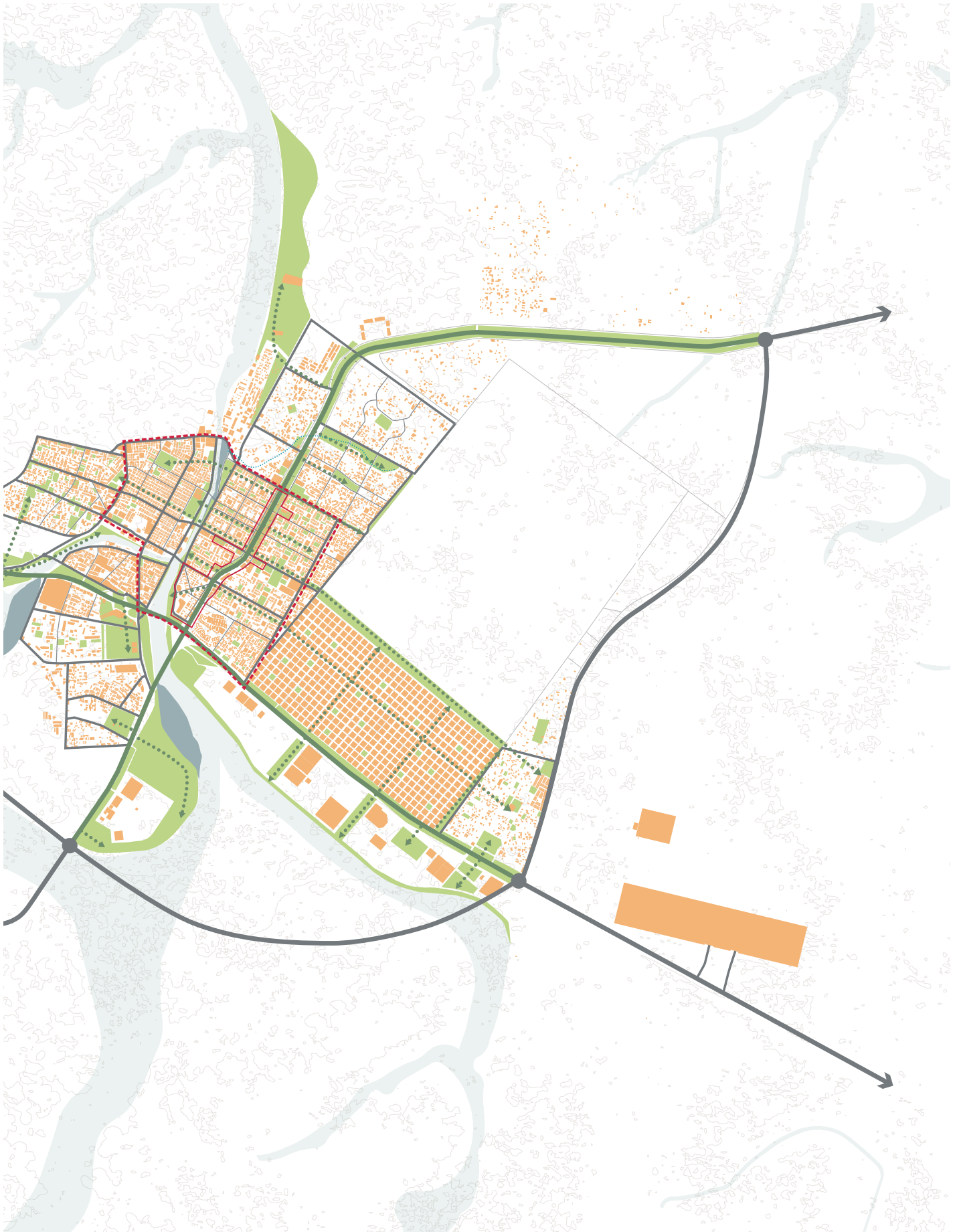
Both the Strategic Vision and the Action Plan emphasise the requirements for a respectfully integrated natural environment and a hierarchical, coherent, and harmonious urban structure in Arar. The demonstration project is conceived as an operational interpretation of the Action Plan, which forms the catalytic basis for the city's fulfilment of the Strategic Vision

The proposal's elements are designed to provide a holistic contribution to Arar's future as an eco-city that can capitalise on its location at the crossroad of international commercial fluxes and pilgrimage access routes.

- The provision of the new transport system and removal of the internal highway will reduce traffic and congestion, improving air quality and reconnecting disjointed areas of the city. This new boulevard and transport system transforms what was a fracture into an inhabited stitch that integrates seamlessly into the pre-existing urban landscape. The boulevard encompasses a pedestrian priority lane and a series of green spaces that disperse into a green network that equitably redistributes access to open public space.
- The green corridor developed on the original highway land will connect to and capitalise on the existing natural ecosystem of wadis and waterfront, re-establishing a healthy and functioning relationship between the built and natural environment. The wadi is reimagined as a linear park that is assisted by an interconnected series of new green spaces and additional drainage, that will assist in natural stormwater management during wet seasons and opening it for new functions during dry season.
- A series of strategic high-density mixed-use developments will expand the connective potential of selected transport nodes and support economic agglomeration and compaction. The boulevard and transport system links to municipality's proposition for a new CBD in place of a disused industrial zone. The integration of this area with the new spine will bring together pedestrian networks, green spaces, mixed-use areas and a new economic core that will be boosted by the new surrounding infrastructure to form the new pulsing heart of the city.



Fig. 14. Strategic vision for Arar





# RESHAPING THE CITY THROUGH PUBLIC TRANSPORT, PEDESTRIAN, AND ECOLOGICAL NETWORKS

# 4



## 4.1 Defining the Study Area

The demonstration project has developed a comprehensive design for a sample section of Highway 80 with recommendation for transposal on the remainder of the highway lengths of both 80 and 85 that lie within the development boundary. The reappropriation of these road structures is resolved by the introduction of a bypass road that will reconnect the city to the external road system.

The design seeks to establish anchor points outside of this primary development area that would demonstrate the relationship and potential impact of the boulevard development corridor with the rest of the city. These points include areas of neglect, areas of ecological importance, key landmarks, the old city centre and core concentrations of facilities, activities and pedestrian access.

The commercially populated pedestrian street in the heart of the old city centre, in the Northwest quadrant, has forms a key anchor point for the new proposal. The project suggests the elongation of this street to connect this important hub to the new boulevard. This elongation will connect the street to the Eid mosque by removal of the mosque's surrounding fence. This action is intended to renew the impact of the mosque on the city, by extending use of its extensive seven hectare grounds outside of its annual occupation. This area provides an additional link to the wadi and supports essential regeneration of the wadi edges.

From the mosque, the existing pedestrian bridge is imbued with a new importance and provides an essential connection to the main intervention area of the highway segment. Vacant land adjacent to this connective path, has also been identified and considered for infill development.

Finally, the disused industrial area is optimally placed for a new CBD adjacent to the former highway crossing point, which is proposed as the future boulevard crossing. This is identified in Arar's Development Plan from the local government and therefore has been considered and integrated in this proposal.

The study area (1393ha), defined in the image on the opposite page by the dashed yellow line at the perimeter, includes the above mentioned anchor points and was considered as both a driver and impact zone of the proposed changes. In order to transform a significant section of the city, this section cannot be considered in isolation from its surroundings or from the potential impact that it could have beyond its own boundaries.

The area of influence (320ha) is defined as those areas that will be most directly affected and, in turn, have had the most influence on the plan for intervention. These areas will be directly connected to the proposed interventions; the wadi, will be reinvigorated and reconsidered as a linear park and complete natural management system for stormwater by new connections formed to a proposed green network and to the new boulevards. The pedestrian street in the city's Northwest quadrant and Eid mosque as existing landmarks of significance will be invigorated by a direct connection to the new spine with its pedestrian routes, parks, transport and mixed-use hubs.

The area of intervention (150ha) is strongly highlighted in yellow, and constitutes the areas of direct intervention that shape the core of the proposal.



Existing pedestrian street in the old centre





WADI ARAR

HIGHWAY 80

NEW CBD

HIGHWAY 85

STUDY AREA 1393ha

AREA OF INFLUENCE 320ha

PEDESTRIAN STREET

EID MOSQUE

INTERVENTION AREA 150ha

PRINCE ABDULLAH BIN  
ABDUL AZIZ BIN MUSAED  
MOSQUE

Fig. 15. Different scales of analysis and interventions

### 4.1.1 Hierarchy of roads

The proposed boulevard's original function as a highway has left the land it occupied poorly connected to the rest of the city. Currently, East to West connections occur every 1000-1500m. The map demonstrates proposed crossings at approximately every 500m.

These new connections re-dimension the grid to highlight landmarks and to give the city a more walkable urban pattern and human scale. A new grid formation is also proposed for the new CBD with the same goals. In addition, the project proposed a hierarchical traffic system of primary, secondary and tertiary roads that emanate from the spine to disperse traffic effectively throughout the city, servicing the new residential areas.

These small changes will serve to further integrate the disjointed quadrants of the city. As a result, congestion and pollution will be reduced and pedestrian access will be improved. These proposals are designed on the principles of sustainable mobility and TOD which endeavours to emphasise pedestrian access.

The project recognises the holistic requirements for design to meet the needs of pedestrians in cities. This entails higher standards in the detailed planning/design of the footpaths (network, pavement, etc.), the elimination of barriers and the improvement of access to buildings and public transport stops.



Fig. 16. Current road hierarchy (top) and proposed road hierarchy by UN-Habitat (bottom)

### 4.1.2 Green and blue networks

Green networks refer to all green open spaces that are accessible and therefore connected via the city fabric. To create green networks, existing public, green, or open spaces such as tree-lined streets, embankments or vacant lots can be extended and connected. Blue networks, formed of planted watercourses and bodies of water, should complete and integrate the green network.

The project's approach to blue and green networks is modelled on sustainable urban planning principles in such a way as to deliver an equal distribution of public services for enhanced quality of life, as well as a wide range of ecosystem services (this refers to the embodied benefits to environmental quality provided by ecosystemic features).

Embedding the blue-green network in the future planning for Arar achieves a number of objectives. Incorporating nature in the city and diversifying the urban landscape also improves drainage design and facilitates social integration and spatial connection through public space.

The wadi network is revitalised and integrated with the built form as a linear park with seasonal functions. The addition of water storage reservoirs will improve its efficacy in flood prevention. The existing linear stretches of green space adjacent to the wadis are envisioned as expansions to create a continuous network of public green space that connects to transport infrastructure and densified mixed-used nodes. Additional spaces are proposed as infill interventions with an even distribution throughout the city.



Fig. 17. Current green network (top) and proposed green network expansion by UN-Habitat (bottom)

### 4.1.3 Major urban functions

The proposal takes into consideration the existing distribution of functions in the city and proposes new interventions designed to enhance and complement the original condition with a further variety of mixed-use nodes. These interventions include:

- New CBD
- Public facilities
- Educational facilities
- Mixed-use residential blocks
- Religious facilities
- Public open space
- Sport and leisure facilities

Sports facilities and public spaces are placed along the wadi to provide links that encourage its seasonal use and highlight its functional relevance. Additional drainage reservoirs assist its role as a stormwater storage facility and will prevent flooding during the rainy season. The proposed network of green spaces will feed into it, opening access for a variety of public functions in the dry seasons. Implementing connections and adjusting the street hierarchy will make the CBD much more accessible and equalise the distribution of public services which currently engender an imbalance between certain areas of the city.



Fig. 18. Current functions (top) and proposed functions expansion by UN-Habitat (bottom)

#### 4.1.4 Key landmarks

Existing landmarks have been considered in order to anchor and integrate the new proposal in the city's pre-existing dynamics. The existing landmarks are key anchor points for the project's development are as follows:

- The pedestrian street that runs from West to East in the old town of the city's Northwest quadrant.
- The Commercial area in the centre of the the city's Northwest quadrant.
- The Eid mosque
- The pedestrian bridge that connects the Eid mosque to the central axis.
- Prince Abdullah Bin Abdul Aziz Bin Musaед Mosque
- Public Facilities in various locations surrounding the pilot development section of Highway 80

The proposal esponds by creating connections etween the new landmarks and the existing ones. They provide additional anchors that provide structural support to further urban activities.

Due to the singular annual use of the Eid mosque, the project proposes the removal of the perimeter fence to allow access over an existing bridge that will connect the western side of the city with the new CBD. The elongation of the pedestrian street in the Northwest quadrant will create a new continuity of the urban fabric through the extension to new mixed-use commercial stretches and nodes that are proposed in the intervention area.

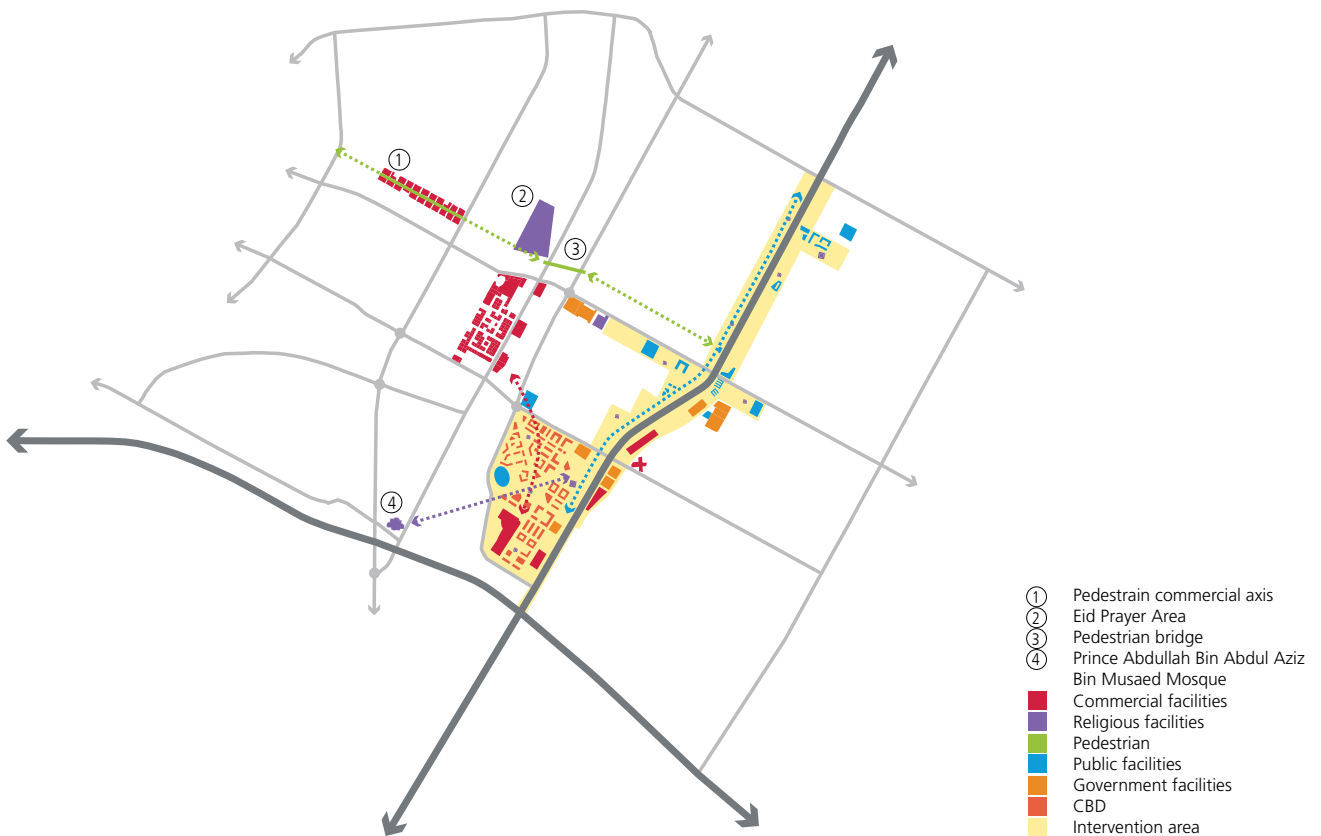


Fig. 19. Current landmarks (top) and future landmarks interaction by UN-Habitat (bottom)

## 4.2 Creating a New Pulsing Heart for Arar

The heart of a city is defined by characters like centrality, identity, social and economic functions, representative and institutional buildings, as well as public spaces of different nature. Collectively, the proposed interventions are intended to provide a new heart for Arar that enhances the existing fabric and facilities with the pertinent insertion of new densities, new landmarks and new functions.

These new elements are designed to further enhance connectivity, replacing the divisive highway with pedestrian routes, mass transit and green spaces. The concentration of activities and residential densities along the boulevard, transform what was once a fracture in the city's fabric into a new pulsing heart, injecting energy and rebalancing access over the entire city.

The new CBD, located South of the intersection between the boulevard and the wadi, is optimally positioned to connect the

new spine to the revitalised wadi system and green corridors. The result is an integrated, sustainable and inclusive design that incorporates densified neighbourhoods on one of the main city arteries.

The exploded isometric drawing on the following page demonstrates how the proposed interventions are layered to create a symbiotic series of networks and connections that feed and invigorate each other.

The new street hierarchy is designed as interlinked with the new network of green spaces to bring new life to existing landmarks and the wadi ecosystem by opening the city to traverse through multiple modes of transport.

Additionally, the introduction of new functions around a nodal hierarchy, equitably redistributes access to commercial and public services throughout the city.



Fig. 20. Vision for the demonstration project

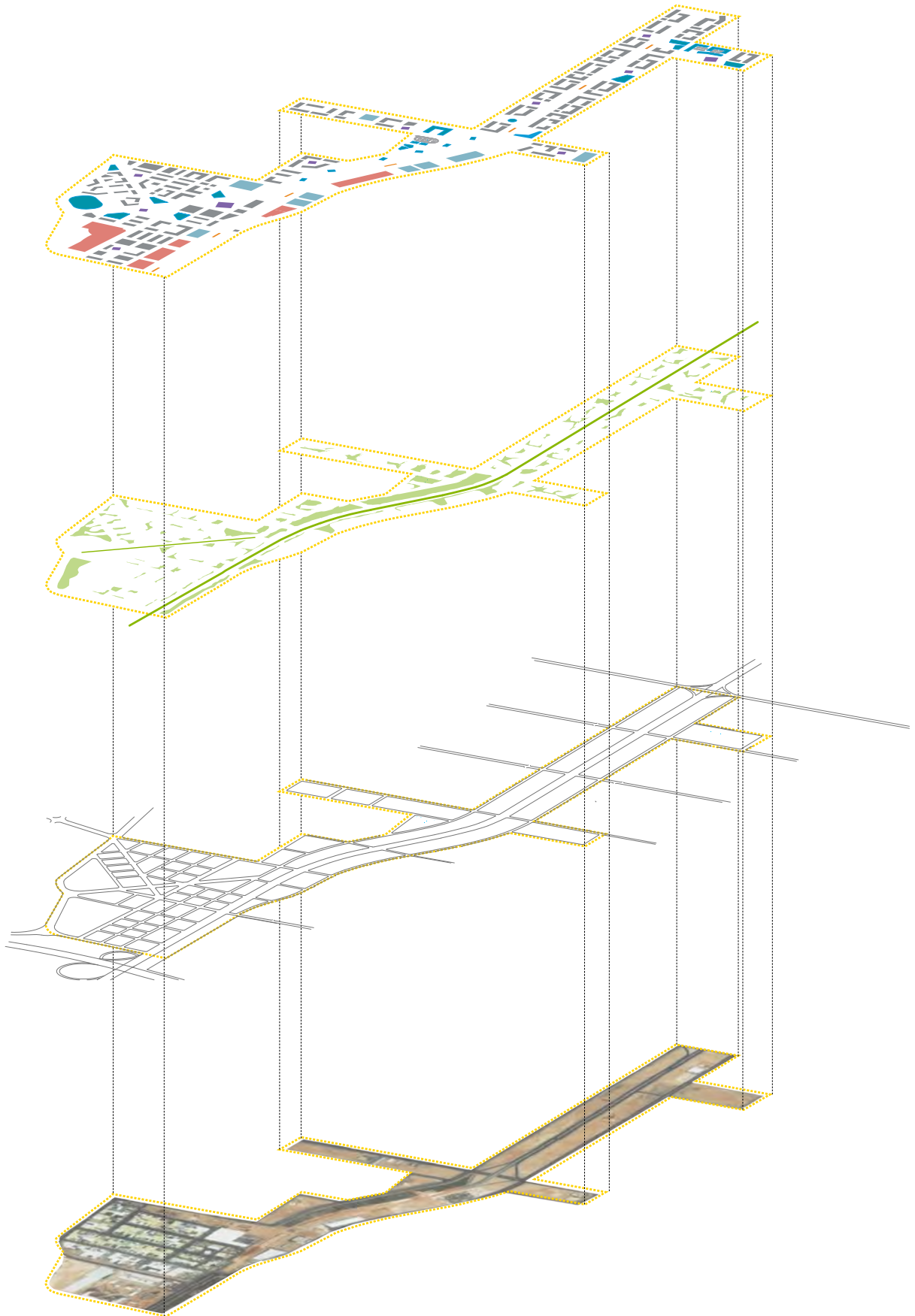


Fig. 21. Overlay of the road, green space, and built infrastructure in the intervention area



Fig. 22. Masterplan for the project





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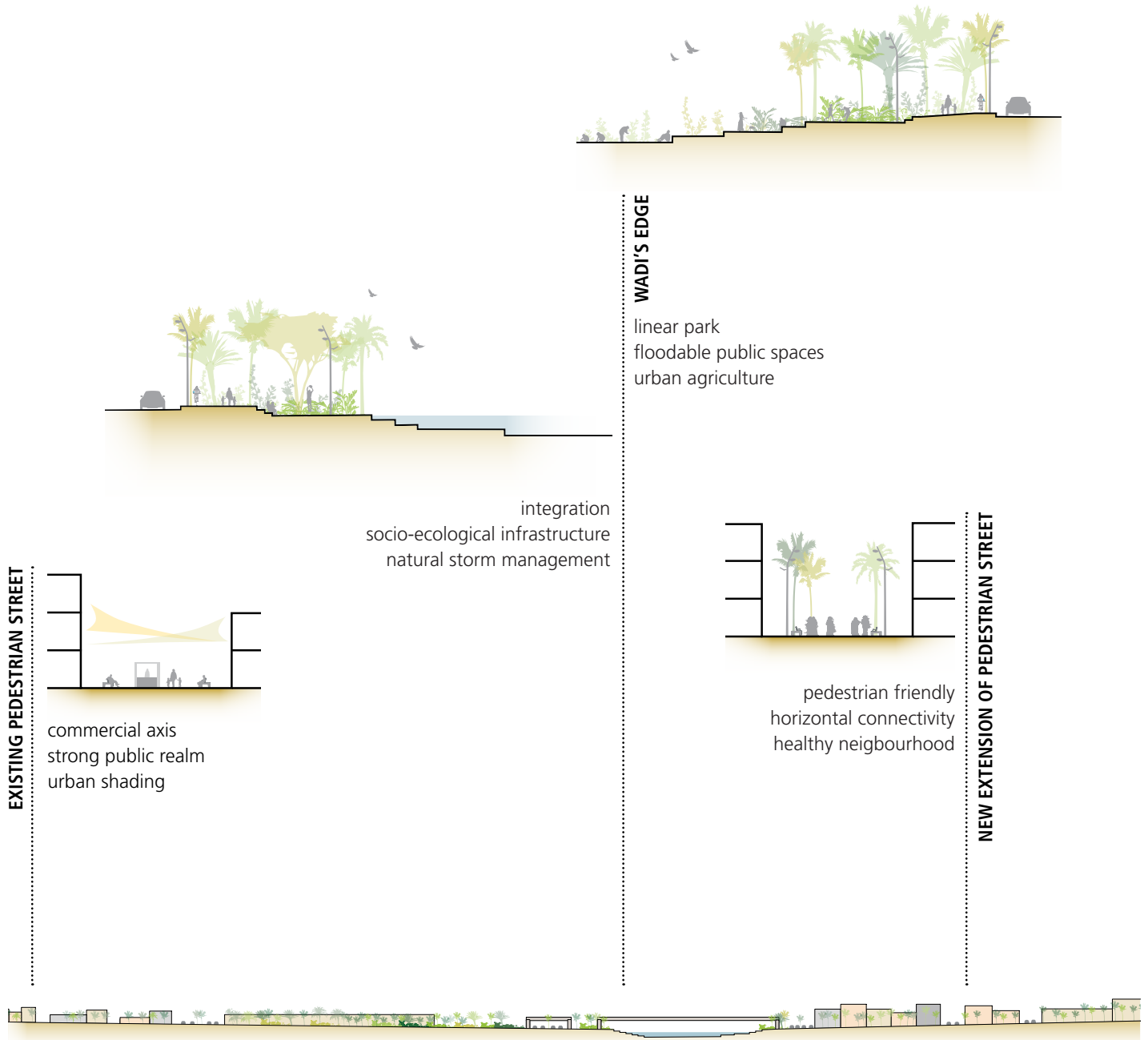


Fig. 23. Masterplan cross-section and detailed sections

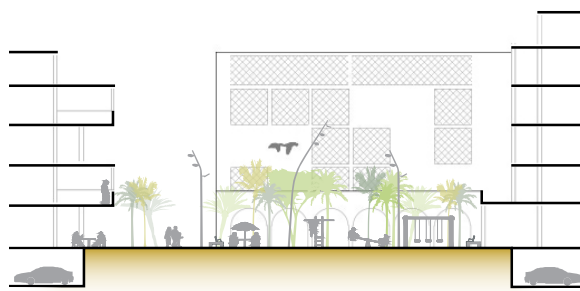


Reference pictures for the boulevard



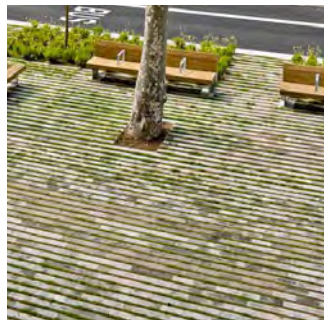
vibrant boulevard  
accessible public transport  
traffic hierarchy

NEW MAIN STREET WITH PUBLIC TRANSPORT



community interaction  
cooler microclimate  
public spaces hierarchy

NEW RESIDENTIAL AREA



### 4.3 Integrating a Public Transport Spine with the Boulevard

Public transport systems provide an important indication of city organisation and an essential service to their efficient function and daily life. As is the case in many Saudi cities, Arar is lacking a public transport network.

The demonstration project aims to address the pervasive condition of overdimensioned roads and lack of mass transportation services in Saudi cities. The project therefore endeavours to provide an exemplar response to the reinvention of divisive, overdimensioned structures as dynamic multi-mode transport routes and to explore the benefits associated with this installation.

Although more in-depth studies are required, the project proposes a magnetic-powered tram as most appropriate in the context of Arar. This was chosen for reasons of cost and flexibility. The magnetic tram requires less infrastructural support which is both financially and environmentally cost-saving.

Tram stations have been strategically placed every 450-550m adjacent to the main crossing roads at intervals that fall within ten minute walking radius. They are uniformly set back 40m from road crossings to maintain efficiency by reducing congestion while maintaining reasonable walking distance intervals.

Catchment areas for tram stations are established to ensure access within a walking radius of 800 metres and additionally to correspond with new cross points that lead into the city on either side.

Syncing traffic lights with the frequency of the tram stops will heighten the efficiency of the station locations at intersections. This means that traffic can be optimised, preventing interference between different transportation systems.

In addition, public facilities have been proposed in accordance with station distribution, in order to maximise their accessibility and connectivity with the rest of the city.



Fig. 24. Public transportation line with its catchment area



*"An advanced city is not a place where the poor move about in cars, rather it's where even the rich use public transportation"*

*Enrique Peñalosa*

*Urban and transportation policy expert and former mayor of Bogotá, Colombia*





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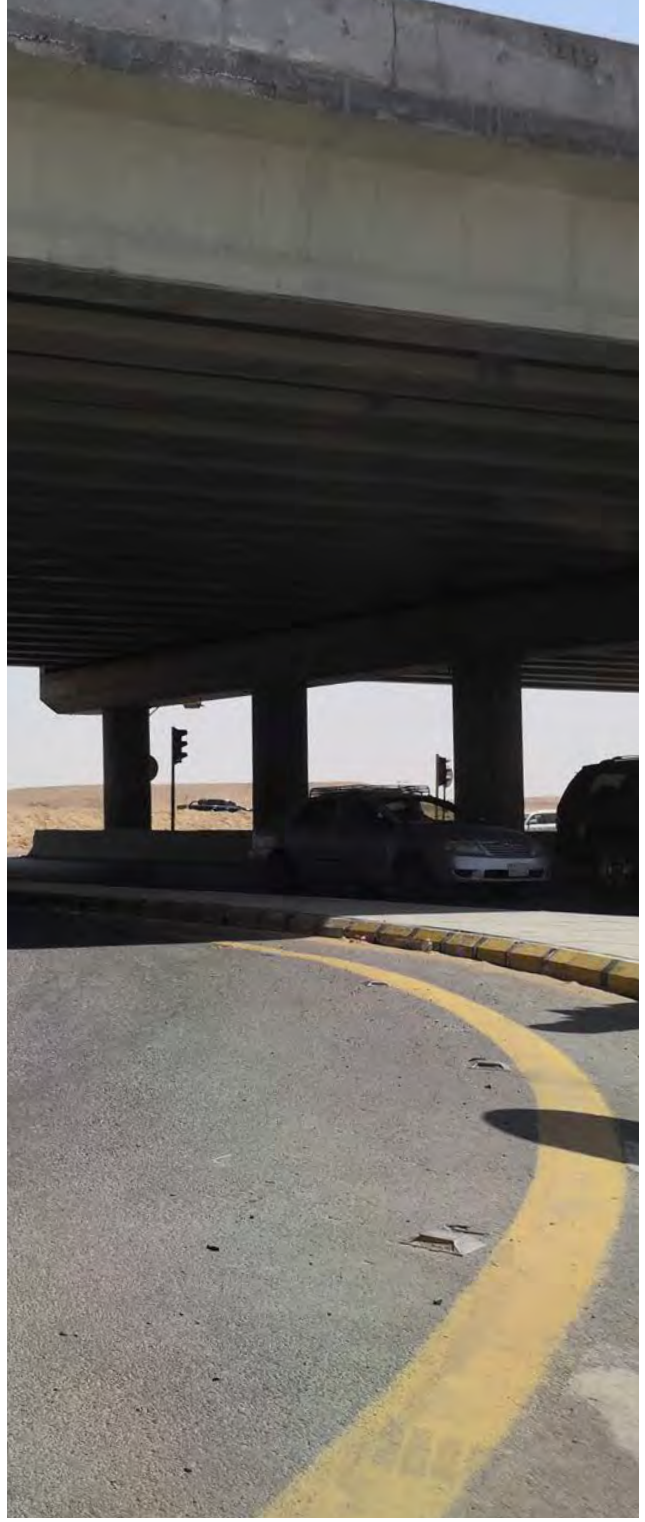
مركز تطوير حقيقي





# 5

## RULES AND ELEMENTS FOR THE NEW BOULEVARD



## 5.1 Rules

### 5.1.1 The structuring of the boulevard

The proposed approach of the demonstration project is based on UN-Habitat's five principles for sustainable neighbourhood planning that support three key features of a sustainable city: compact, integrated, connected.

The five principles are:

1. Adequate space for streets and an efficient street network,
2. High density (at least 15,000 people per km<sup>2</sup> or 150 people per hectare),
3. Mixed land-use,
4. Social mix, and
5. Limited land-use specialization.

The zoom section in figure 26 further demonstrates the dynamics of these principles as follows:

- Blocks are designed as residential with commercial space accommodated on the ground floor to connect their volumes with the streetscape. Blocks are externally designed to mimic the continuity of the wider grid system with interior courtyards, reducing their internal volumes. In this internalised design, the external grid system of roadways gives way to an internal system of pedestrian pathways that weave through internal green spaces. This humanises the scale of the block whilst maintaining visual continuity with the rest of the city.

- Several public and commercial facilities are strategically distributed throughout this new fabric. A series of mosques are proposed throughout the intervention space. The position of these mosques has been chosen to ensure equitable access for all citizens are thus placed at intervals of two blocks.
- The elementary school and connected kindergarten in the northern area of the plan, are designed to connect to the adjacent green space. The additions of a library, museum and a cultural centre are also strategically distributed to ensure equitable access to public services and to bring collective life into each area of the neighbourhood. The distribution of these facilities has been set in such a way that connects them to each other within a walkable radius of 500m.
- The community centre is positioned as a connection point to Eid Mosque where the pedestrian street in the old city connects with the boulevard. This community centre is posited as a new landmark and additionally contributes as a viewing point.
- In addition to public facilities and the commercial facilities distributed at the ground level of the new housing blocks, a market and a hotel are proposed in the Northeast area of the plan.



Fig. 25. Detailed part of the intervention area

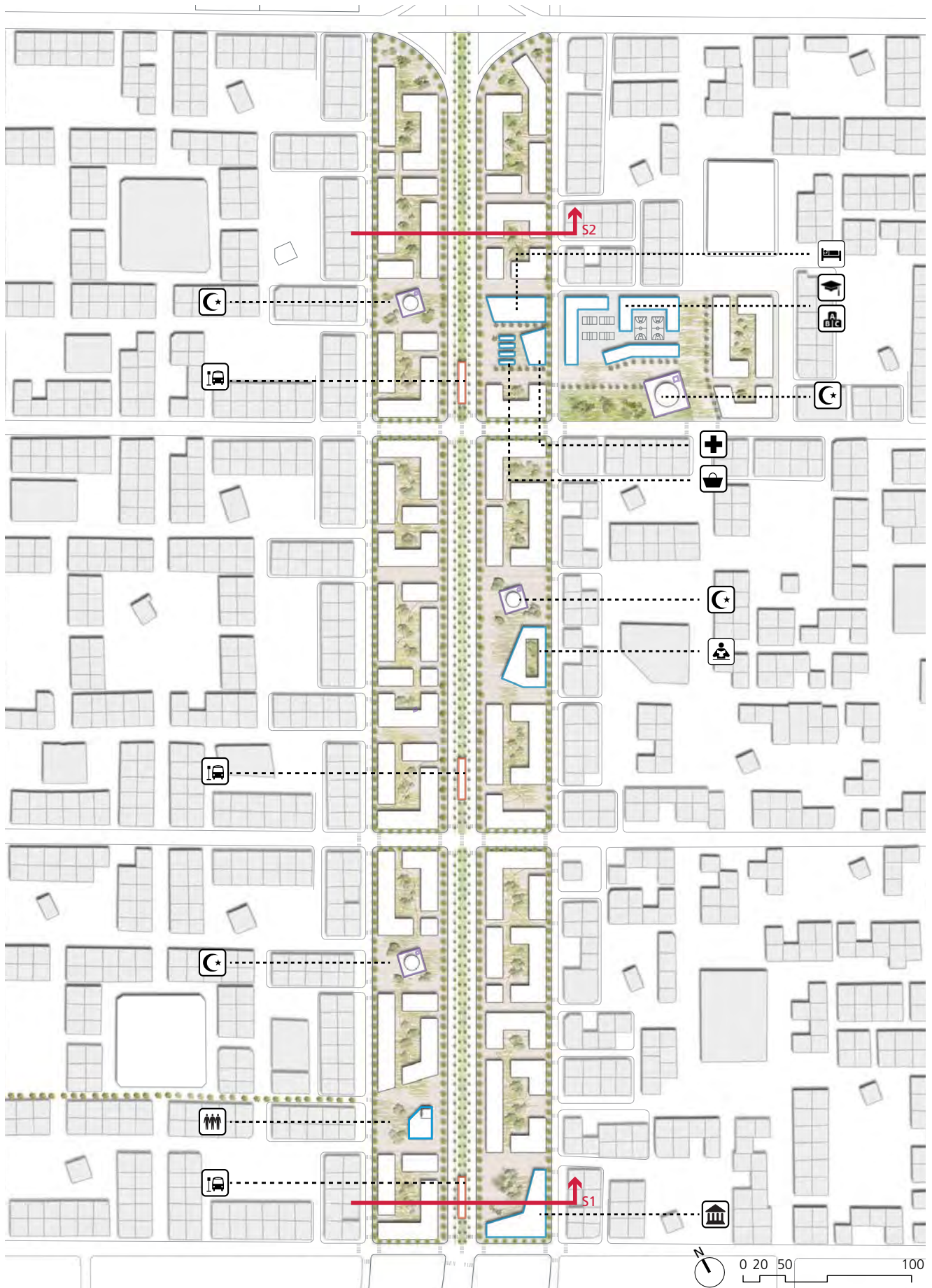


Fig. 26. Detailed part plan of the intervention area

### 5.1.2 The reorganisation of traffic hierarchy and movement

The Boulevard has been developed as a primary artery for Arar crossing the city from North to South and provides connections at specific points to avoid traffic interferences. This operates at several scales:

- At the city scale, it provides both a North-South transit route with major intersections at several new points. Traffic on the primary routes (denoted by red lines in the zoomed section) will be alleviated by the increased number of connections to the secondary road network and the clear delineation of a hierarchical flow.
- At the neighbourhood scale, traffic is resolved through existing and proposed secondary roads. These are denoted on the Traffic hierarchy and movement plan of the boulevard as solid peach lines. These systems disperse traffic at an improved frequency from the primary roads and thus reduce congestion in the city and on the primary routes.
- At the block scale, underground parking areas service inhabitants through restricted inner streets. These function as a tertiary road systems that are, in turn, fed by the secondary systems. These are denoted as peach dotted lines of the same colour as the secondary routes on the same diagram.
- At the pedestrian scale, stations are placed adjacent to crossing areas, leaving a buffer zone of at least 40m. A protected bike lane is introduced along the boulevard's length, naturally shaded by trees on both sides. Pedestrian routes infiltrate the block, thereby creating human scale access points within the large scale blocks. These routes are denoted by dashed yellow lines.

The section of the proposed boulevard demonstrates the composition of the complementary systems for various transport modes. Two car lanes of 3 metres width are proposed at either side of the boulevard's spine. Adjacent to these, an additional lane of parking (2.5m) and a 10m lane to accommodate delivery and service access, bikes and footfall are proposed. Two public transport lanes occupy the central stretch to accommodate the proposed trackless tram with access to the joint stations from either side. These are accompanied by a 10m green stretch with kiosks and seating. Though primary traffic routes follow the boulevard, pedestrians are prioritised and congestion on these routes will be reduced by the presence of further secondary connections.

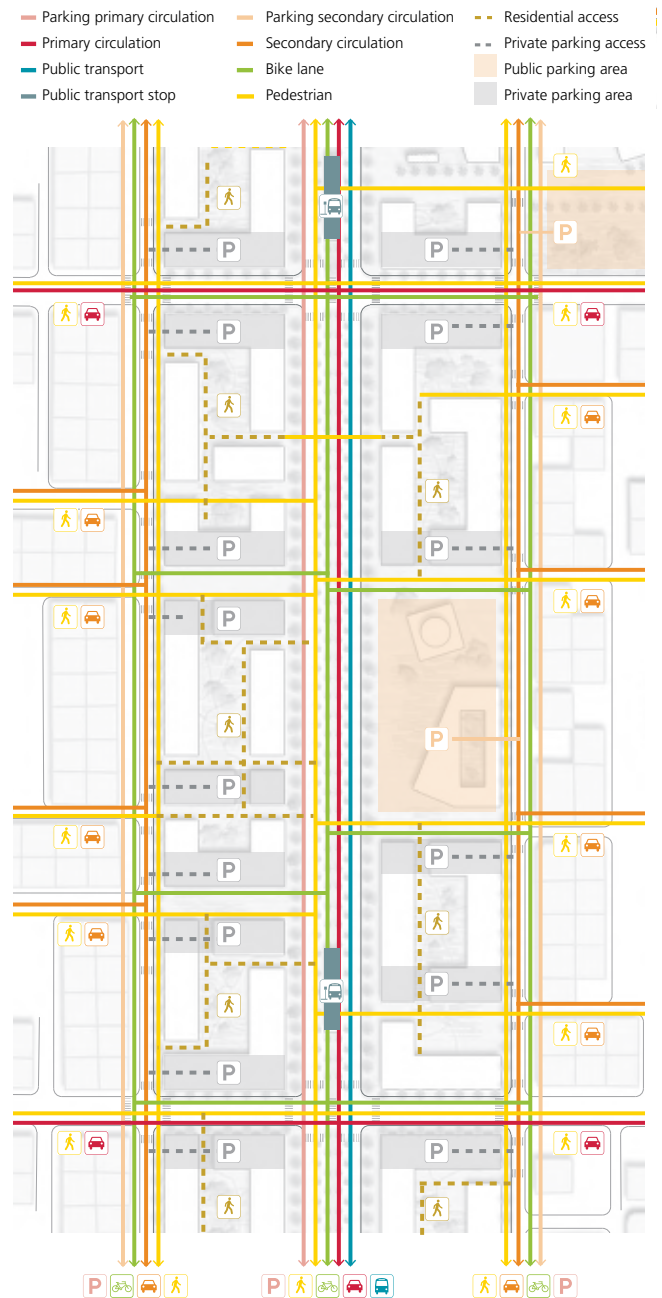


Fig. 27. Traffic hierarchy and movement pattern

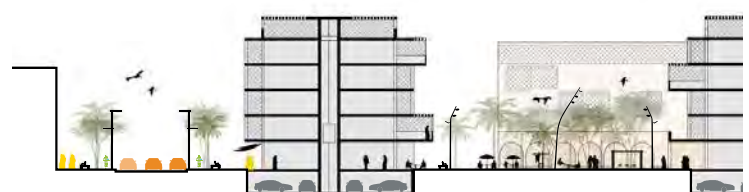


Fig. 28. Section 1

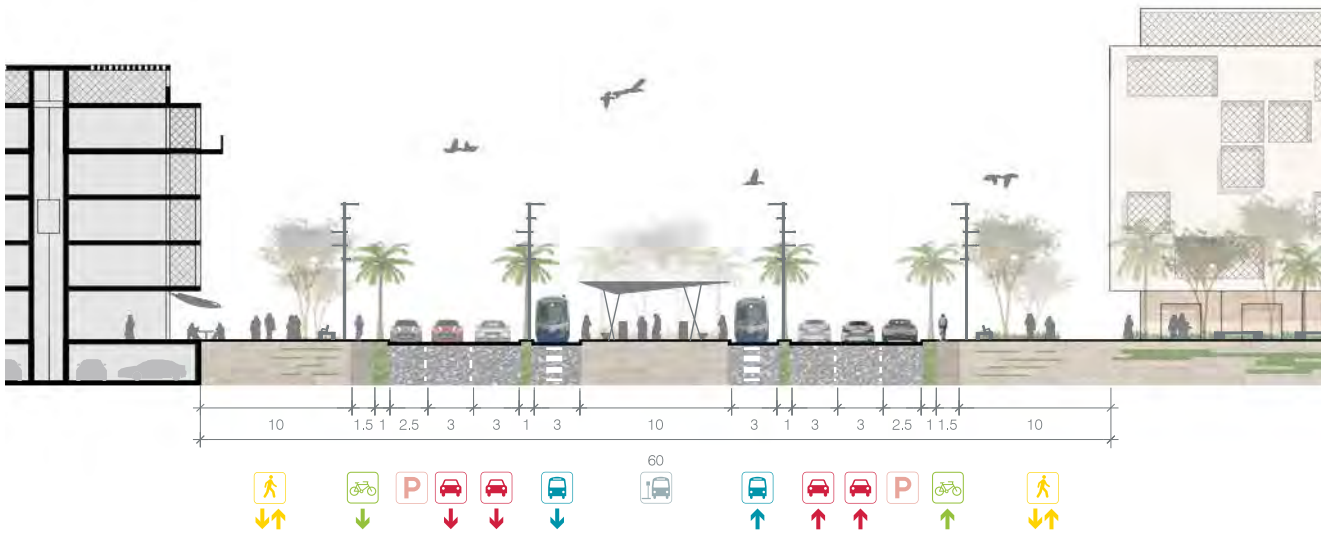


Fig. 29. Section 1A - The public transport

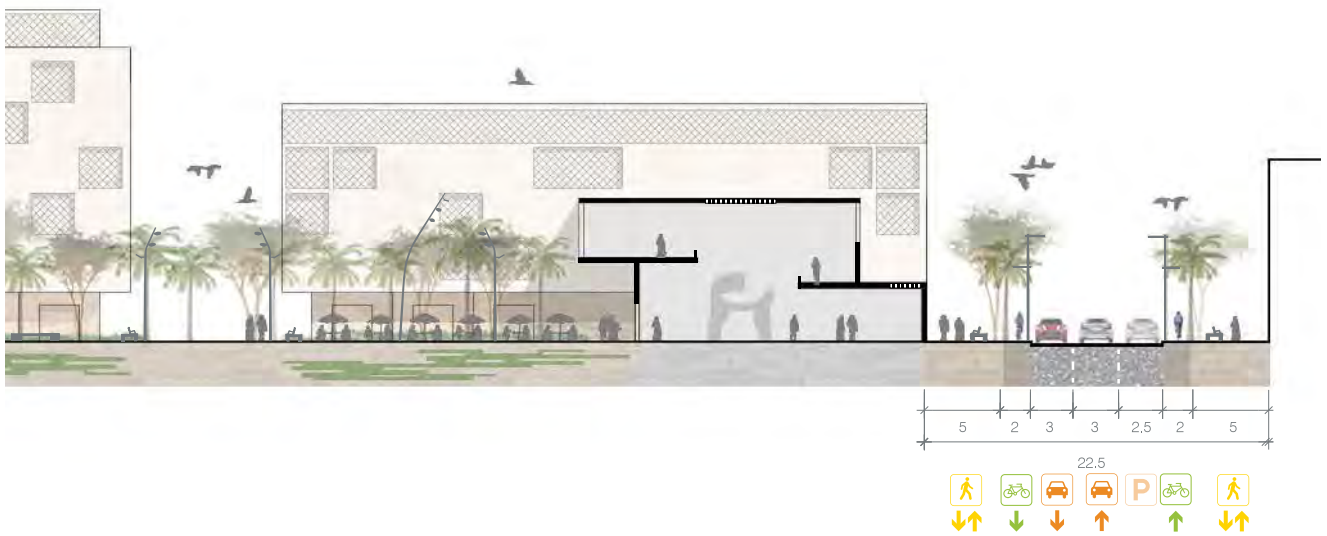
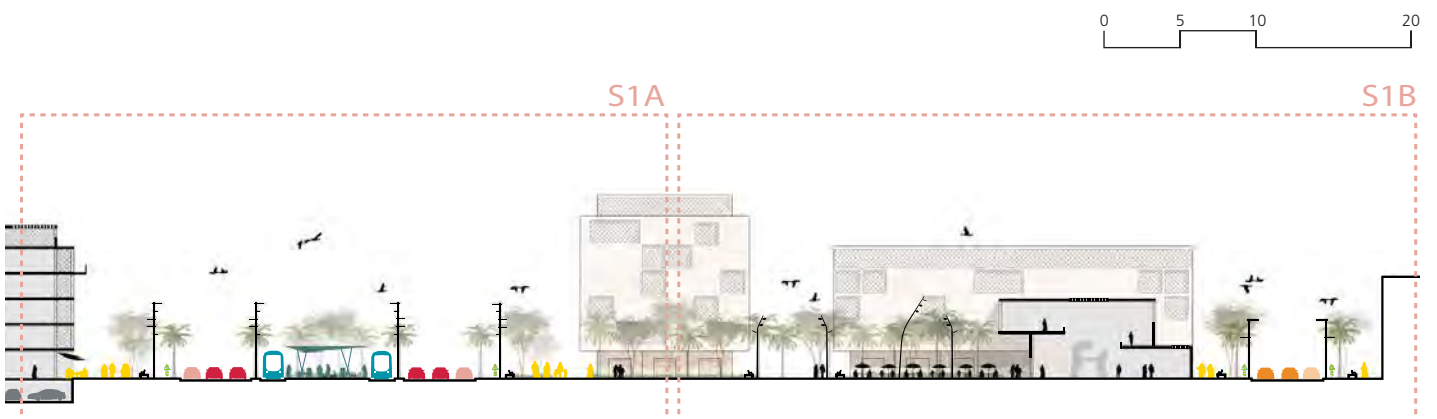


Fig. 30. Section 1B - The public space



## 5.2 Elements

### 5.2.1 Hierarchy of the public space network

In the demonstration project, public spaces are proposed as evenly distributed across the city, and organised in hierarchical scale assigned to particular spatial typologies. Open spaces are therefore categorised in accordance with their relationship to their surroundings as urban public, neighbourhood public and community semi-private. This is further detailed as follows:

- At the city level, the green boulevard forms a primary corridor that doubles as a transit artery. This connects to the wadi network, which is envisioned as a major linear public space designed to promote conservation, natural-stormwater management and biodiversity.
- At the neighbourhood level, green areas, civic and market squares and other hard surfaced areas designed for pedestrians accompany proposed facilities. For example, public playgrounds are associated with schools and crèches.
- At the residential level of the block, smaller spaces such as courtyards and children’s playgrounds are placed centrally to service inhabitants, providing opportunities for informal recreation within residential areas. These spaces are semi-private in nature as they are generally restricted in use, and are not widely used by passers by.

All open spaces are approached as a system, working together to form a unified network with a harmonic hierarchy.

### 5.2.2 Public realm and pedestrian connections

The project focuses on the overall improvement of the public realm, with a strong emphasis on pedestrian connectivity. The proposal improves walkability with large amounts of pedestrian space and new connections within the existing fabric. This leads to a new system of relations between residential areas and various urban functions that is intended to optimise vibrancy and porosity of the public realm:

- *Relation between residential areas and facilities:* New residential areas are proposed in the infill areas adjacent to the previous highway structure and are designed to include street-level commercial facilities that reflect a similar dynamic to the existing commercial pedestrian street in the Northwestern quadrant of the city. These are designed to line the new 10m wide pedestrian streets that sit on either side of the public transport spine and will accommodate shops and restaurants with terraces.
- *Relation between residential areas and stations:* The new residential areas are additionally connected with the proposed transport infrastructure and the line of stations that are distributed across the North-South axis.
- *Relation between residential areas and public space:* The new residential centres are proposed as both adjacent to and comprising of public space. The location adjacent to the boulevards provides easy pedestrian access to the network of spaces that radiate through the city via strategic connections from the transport spine and blocks are designed to include small internal spaces such as children’s playgrounds.

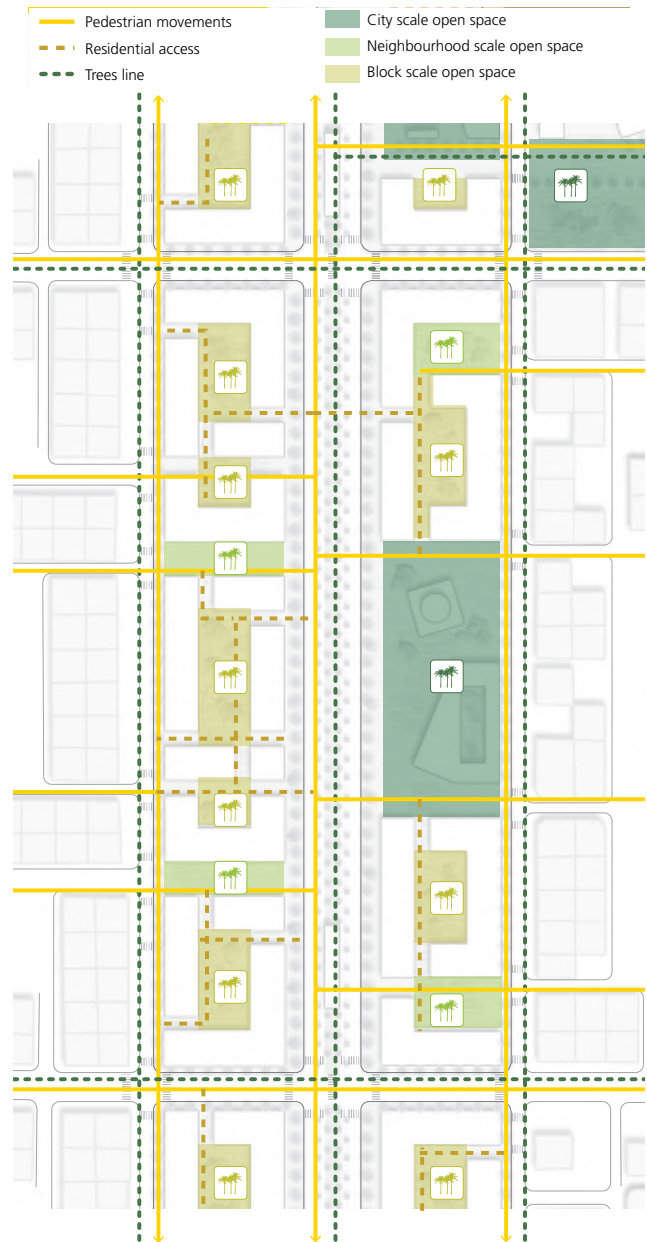


Fig. 31. Public spaces hierarchy



Fig. 32. Section 2

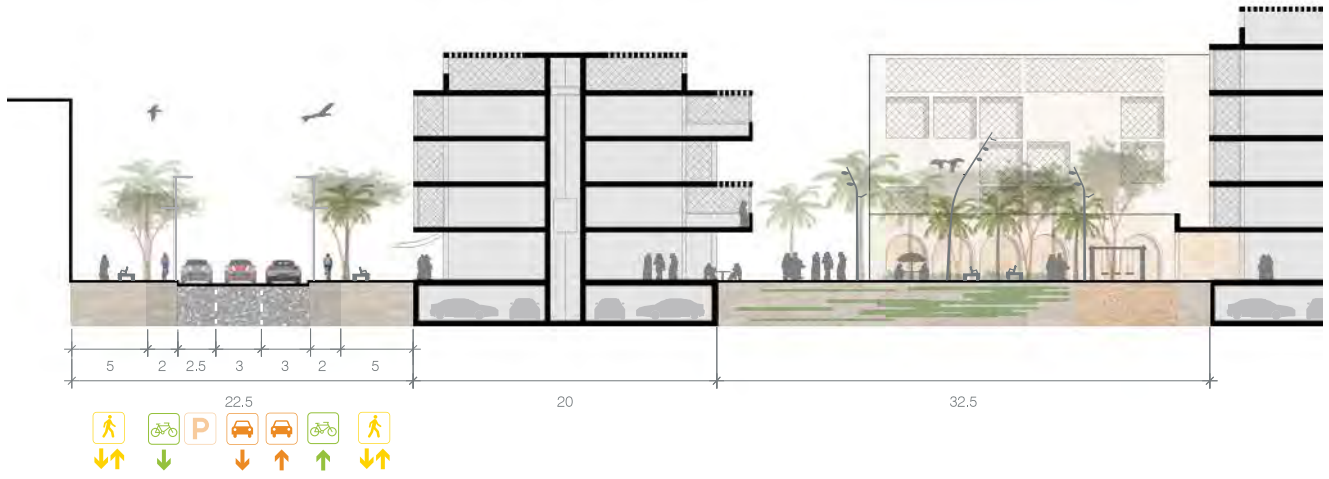


Fig. 33. Section 2C - The neighbourhood

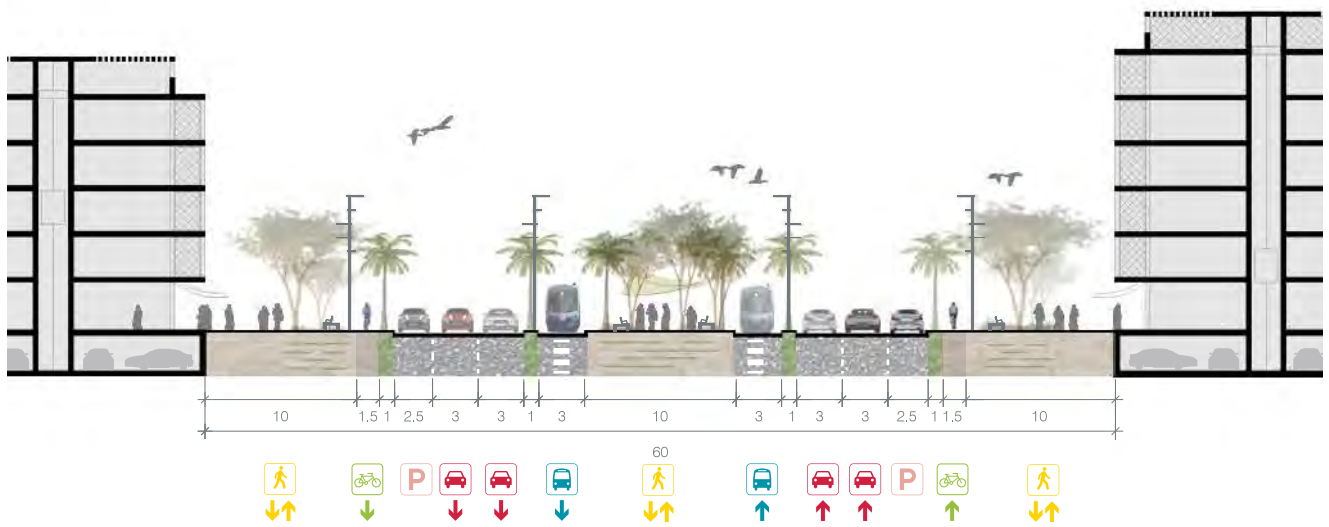


Fig. 34. Section 2D - The boulevard

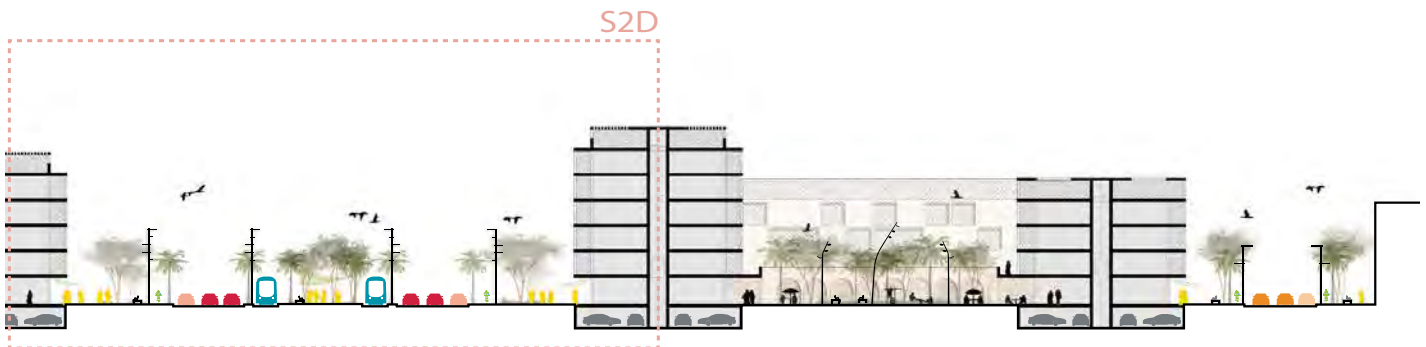
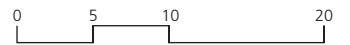




Fig. 35. Conceptual sketch of the boulevard







# 6

## FINANCIAL FEASIBILITY ANALYSIS



## 6.1 Overview

The demonstration project proposed by UN-Habitat includes a modern trackless tram as public transportation and new mixed-use land developments in Arar based on international planning and design principles for sustainable, resilient and compact urbanization.

The analysis that follows investigates the economic and financial returns of UN-Habitat’s proposal. This chapter assesses the viability of the demonstration project. It does this by simulating the application of a series of assumptions and cost-recovery options to accompany the physical plan.

These focus on alternative funding sources and potential private sector engagement through public-private partnerships (PPPs).<sup>1</sup> These simulations allow for assessment of the impact and benefits generated for Arar by the preceding proposals.

PPPs are defined as “long-term contracts between a private party and a government entity, for provision of a public asset or service, in which the private party bears significant risk and management responsibility.”<sup>2</sup> In order for PPPs to be successful, local government must be able to authorise and enforce such contracts and the proposed project must offer a solid risk-adjusted return.<sup>3</sup> Private sector returns in PPPs may take a number of forms such as revenue collected through betterment levies, user fees, and property tax.

UN-Habitat’s analysis gives evidence on how the project may mobilise more own-source revenue, supporting local Government to increase local budget as indicated by National Transformation Programme 2020 (NTP).<sup>4</sup>

## 6.2 Methodology

While the cost-recovery target population for the demonstration project is largely comprised of residents, the local demand for commercial and leisure activities are also included. The cost recovery strategy is deployed to respond to the target population as demonstrated in figure 36.

Strategies orientated around public transportation, retail, business, recreation, and services are better suited to the resident population. The private returns to investment calculated in this analysis make use of the aggregate definition of the resident population, which includes both permanent and transient residents.

Population estimates, provided by UN-Habitat, are used to calculate the permanent population in order to provide a more detailed disaggregated analysis that is able to differentiate between the resident population and consumer population.

The first evaluation (Figure 36) provides a market estimate that sets a foundation for the financial analysis and project capacity, specifically revenue generation potential from property tax, and parking fees.

Figure 37 provides a summary of the assumptions included in the analysis, grounded in three main themes: land, business landscape, and infrastructure capacity.

The feasibility analysis provided below highlights four categories: public transportation, residential, commercial, and public space.

	Target markets	Recommendations
<b>Public transportation</b>	Local market: households, individuals and business. Secondary demand: neighbouring office buildings, visitors in the vicinity	Highly visible and accessible with international standard
<b>Residential</b>	Local market: households, individuals and business corporates	Differentiate residential options, services and facilities offered in order to attract different market segments
<b>Commercial</b>	Primary demand: residents, office tenants, visitors Secondary demand: neighbouring office buildings, visitors in the vicinity	Highly visible and accessible retail area with internationally recognised brands and anchored restaurants and coffee shops
<b>Public space</b>	Primary demand: residents, office tenants, visitors Secondary demand: neighbouring office buildings, visitors in the vicinity	Highly visible, well maintained and accessible area with family facilities, playgrounds and coffee shops

Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 36. Target market recommendations

**Assumptions & Benchmarks**

<b>Total target area (ha)</b>	<b>38.9 ha</b>	
<b>Inhabitants (following 150p/ha UN)</b>	5,835 People	
<b>Public transportation (trackless tram) composed by 3 stations</b>	3 Km	
<b>Area details</b>	<b>Ha</b>	<b>Sqm</b>
Residential	36.7	367,000
Semi private space inside blocks	4.5	45,000
Commercial	3	30,000
Roads	12.69	126,900
Public space	10.5	105,000
Parking (1,860 slots)	9.675	96,750

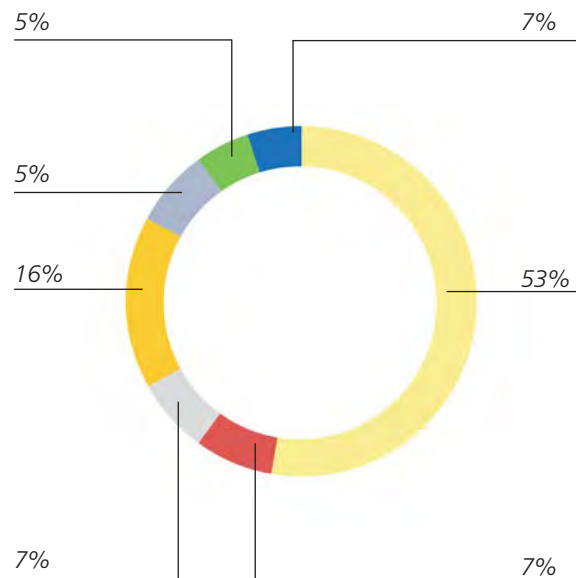
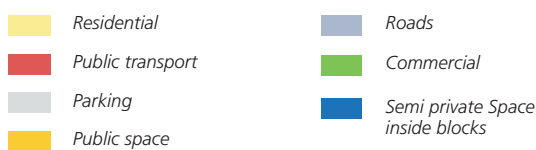
Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 37. Demonstration project baseline assumptions

### 6.3 Capital Investment

The following section outlines capital investment estimates based on preliminary local data and should, therefore, serve as a rough approximation of the demonstration project’s costs<sup>5</sup>.

Preliminary analysis estimates total investment at approximately SAR 1 billion. This includes construction of residential area (53 percent), semi private space inside blocks (5 percent), commercial (5 percent), roads (7 percent), public space (16 percent), parking (7 percent), and public public transport (7 percent) .



Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 38. Capital investment breakdown

### 6.4 Private and Public Sector Finance

A central assumption of the demonstration project simulation is the role of the private sector which would assume partial responsibility of the project financing, including all real estate components.

The public sector is responsible for providing land for the proposed developments. Additionally, the public sector will fund roads, public space, and part of parking area.

At this stage, it assumes that public transportation is financed by public sector. Further analysis will be required to attract private capital for this infrastructure.

The preliminary evaluation estimates capital costs for the private sector at approximately SAR 780,420,750, of which a large share would be allocated to construction of residential apartments (3,000 units), commercial activities (171 units with an average size established according to market research), and private parking (4,000 parking slots).

The core investments from the private sector are allocated to residential activities, followed by commercial. Therefore, the project returns for private investors are subject to the real estate market dynamics and local prices.

The number of commercial activities is estimated based on a market investigation conducted in the Kingdom, by which we identify five categories of commercial activities and their related dimensions.

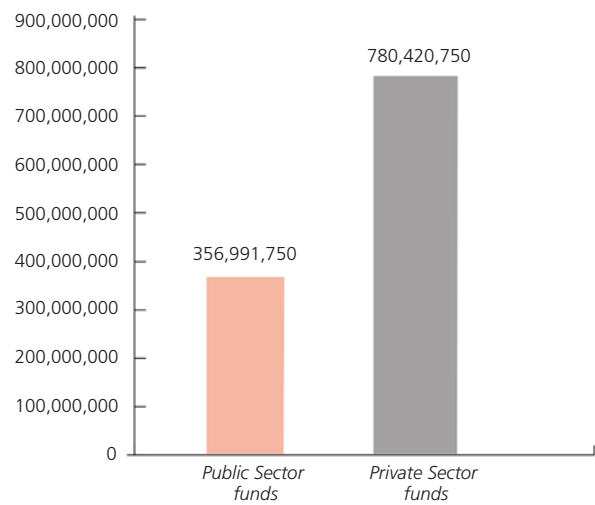
These categories are applied in accordance with a strategy oriented to implement attractive business and anchored facilities for different consumer segments.<sup>6</sup> Figure 42 shows the categories of commercial activity proposed.

The project benefits and long-term financial feasibility are based on revenue generation estimates from residential and commercial properties.

The financial feasibility of the demonstration project is calculated based on international and local data for the two categories of land use (residential and commercial) and the project impact is calculated using benchmarks extracted from case studies and international practices.<sup>7</sup>

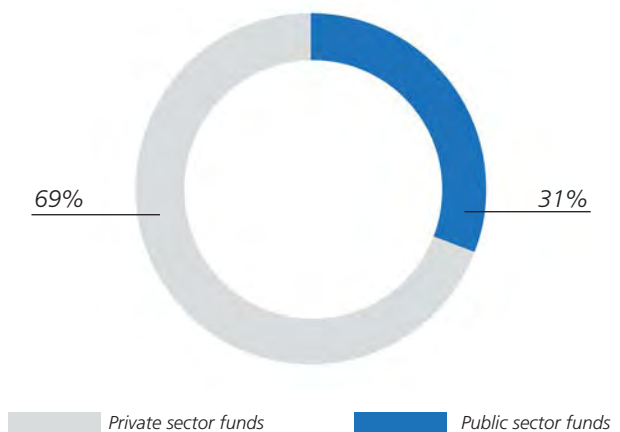
The demonstration project aims to attract investment in the local real estate market, provide guidance on urban development strategies, and show the value of sustainable urbanisation through collaboration with the private sector (PPPs).<sup>8</sup>

Figure 41 shows the baseline assumptions used to estimate the economic returns for residential, and commercial land use.



Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 39. Private and public project funds



Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 40. Private and public project funds breakdown

Local Benchmarks & Assumptions	
<b>Residential</b>	
Average land value (SAR/sqm)	SAR 320-380 per sqm
<b>Commercial</b>	
Average monthly rent fees (SAR)	SAR >4,000 per month

Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 41. Benchmarks for Real Estate analysis in Arar

Total commercial area	Average dimension	Number of units proposed
Retail, Anchor Restaurants	325	28
Retail Market, Coffee Shops	160	38
Accessory shops, service retail	100	60
Gyms, Potential Anchors & Facilities	2,250	3
Others (small retails and family shops)	70	43

Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 42. Commercial activities proposed



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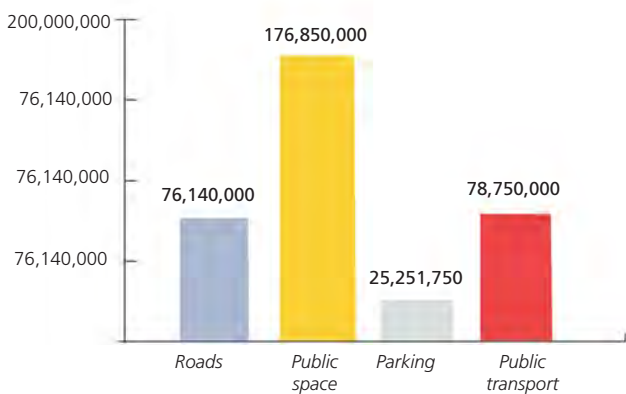
Area to be developed

## 6.5 Financial Instruments for the Public Sector

### 6.5.1 Public sector financing

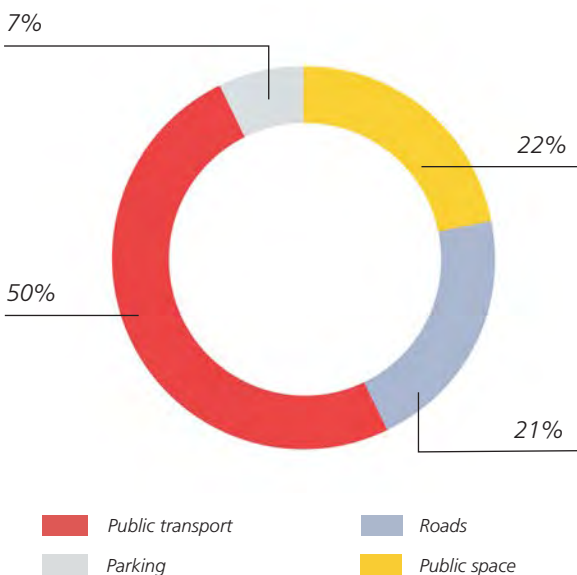
As previously stated, the feasibility analysis of the demonstration project incorporates the various UN-Habitat planning and economic recommendations for sustainable, resilient, and compact urbanisation.<sup>9</sup>

The success of the demonstration project ultimately depends on the ability of the municipal authorities to mobilise own-source revenues through a number of different financial instruments.



Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 43. Public project finance



Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 44. Project finance breakdown for the public sector

This section examines the viability of the demonstration project in relation to the assumed role of the public sector.

In this scenario, key infrastructure (i.e. public transportation, roads, parking facilities, public spaces) is financed by the public sector. Figures 43 and 44 show the project investment details for the public sector.<sup>10</sup>

While the private sector may benefit from real estate instruments to recover investments, the public sector does not currently have fiscal instruments capable of collecting sufficient revenue for the development of such a project. For this reason, a financial feasibility analysis was implemented to test different tax instruments that would improve the public sector’s ability to generate own-source revenue for the annual budget.

The tax instruments explored in our analysis are (1) betterment levies, (2) parking fees, and (3) property taxes.<sup>11</sup>

### 6.5.2 Revenue generating tax instruments for municipal governments

#### a) Betterment levies

Typically, a government imposes a betterment levy on the owners of certain properties.<sup>12</sup> “It is used to either entirely or partially fund the cost of a specific improvement or service that benefits the public (generally) and confers a special benefit upon the owners of certain properties.”<sup>13</sup>

According to international experiences, investments in public facilities (schools, health), walkability areas and public space, and commercial areas can increase land values to 13 percent, and 17 percent respectively.<sup>14</sup>

The proposed public transportation may have an extremely significant impact on land value, though this also depends on the real estate framework and its dynamics. Figure 45 gives evidence on benchmarks from case studies.

UN-Habitat’s analysis ran three simulations (low, medium, high) based on international experiences with betterment levies, in order to estimate the potential land value increase in Arar that would result from implementation of the demonstration project.<sup>15</sup>

In order to accurately estimate the impact of the demonstration project on the surrounding properties, additional micro-level



Case Examples	Key Findings
Dubai, United Arab Emirates; Cairo, Egypt	Urban development that included retail facilities resulted in a price premium of 15 – 20 percent Schools increased residential land prices by approximately 13 percent Walkability within a residential community increases home values by up to 9 percent
Bogotá, Colombia	Research has suggested that for every additional 5 minutes of walking to a public transportation station, rental prices fell by 6.8 to 9.3 percent

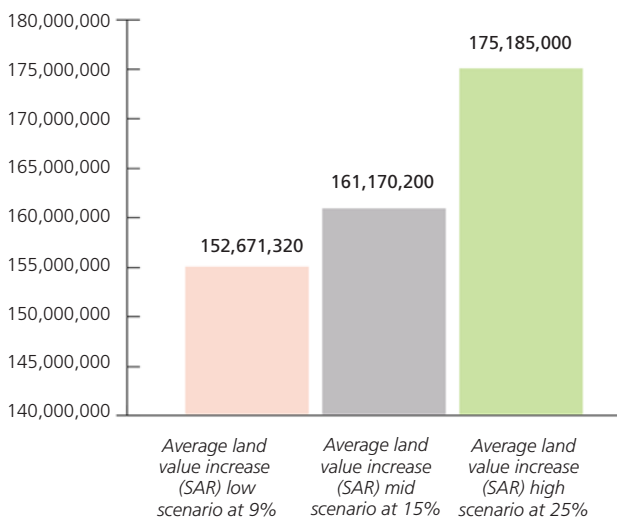
Source: Colliers International (2017); Rodríguez and Targa (2004)

Fig. 45. The Impact of Infrastructure development and planning on land value

Benchmarks & Assumptions	
Low Scenario	Percentage of land value increase – 9%
Mid-Scenario	Percentage of land value increase – 15%
High Scenario	Percentage of land value increase – 25%

Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 46. Benchmarks & assumptions for betterment levies analysis



Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 47. Impact on land value generated by the project

data and investigations are required. However, the simulations in this analysis provide preliminary land value estimates (Figure 46).

The potential land value increase is calculated based on three targeted scenarios (Figure 47). These calculations draw on the data collected in Arar on the local real estate market.

In the “high” scenario, an estimated SAR 50 million in revenue was generated by betterment levies. In this simulation, the betterment levy is imposed once, and the revenue collected might be used to cover part of the cost for infrastructure, public space, facilities maintenance and other costs.

In this projection, betterment levies (SAR 15,777 per unit) on the real estate development properties (3,172 units) proposed in the demonstration project are included in the revenue estimate.

UN-Habitat’s analysis suggests that betterment levies are a viable option for infrastructure cost recovery and for other project operating costs in Arar.

However, as betterment levies are not recurrent, they are more appropriate to mobilize stable, reliable, and multiannual revenue flows for local budget.

It is important to note that revenue from neighbouring properties that could potentially benefit from the proposed infrastructure projects were not included in this analysis due to a lack of information and data.<sup>16</sup> As a result, the projections likely represent lower bound estimates.

**b) Parking fees**

User fees can provide a long-term source of revenue for municipal governments. In the case of Arar, parking fees are well suited to the infrastructure proposed in the demonstration project, which includes 1,860 public parking lots.<sup>17</sup> Figure 48 demonstrates that 1,860 public parking lots would generate more than SAR 16 million in revenue per year (13 percent of the current own-source revenue collected in Arar).<sup>18</sup>

Although a more detailed analysis is required, these findings suggest that parking fees could provide a significant source of revenue for the city and highlight the importance of exploring this option further.<sup>19</sup> Figure 48 provides the benchmarks for the analysis.

Benchmarks & Assumptions							
Parking Slots	Fee / hour	Time zone	Total hours / day	Revenue one-slot / day	Revenue one-slot / month	Revenue one-slot / year	Total Annual Revenue
1,860	SAR 2	8:00am 7:00pm	12	SAR 24	SAR 744	SAR 8,928	<b>SAR 16,606,080</b>

Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 48. Parking fees benchmarks and assumptions

**c) Property taxes**

Property taxes are the third option for own-source revenue generation that provide an alternative to betterment levies.

To estimate the effect of property taxes in Saudi Arabia, international case studies (UN-Habitat 2016)<sup>20</sup>, the Finance for City Leaders’ Handbook (UN-Habitat 2016)<sup>21</sup>, and common property tax regimes in emerging economies are used to provide a baseline.<sup>22</sup> Two tax rate options are considered that differentiate between commercial and residential properties.

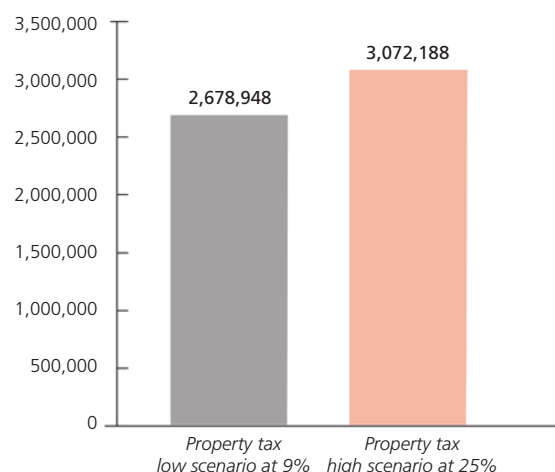
- Property tax rate estimate for commercial property is 2.5 percent
- Property tax rate estimate for residential property is 1.75 percent

Property taxes are collected annually and based on property rental data collected in Arar. Figure 49 shows the forecast for revenue generated in this property tax analysis, comparing two scenarios: Low Scenario (9 percent increase of land value) and High Scenario (20 percent increase of land value).<sup>23</sup>

The annual revenue generated by real estate is estimated at SAR 3 million in the High Scenario. By extending the project horizon over three milestones (5 years, 10 years, 15 years), the potential impact of the property tax as component of public finance system becomes increasingly evident (Figure 50W).

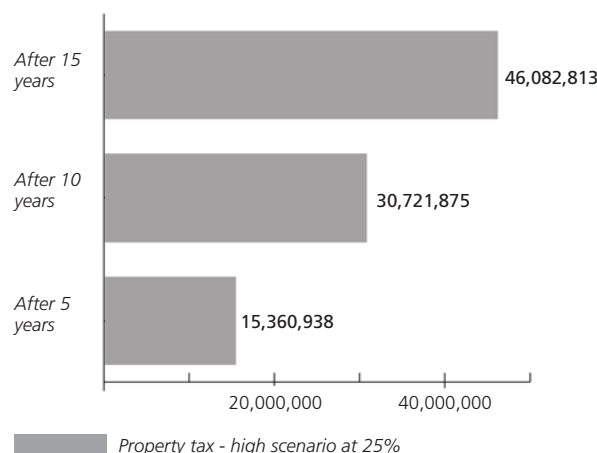
It is important to demonstrate the significant contribution to the financial sustainability of the project over the long-run with the use of this powerful revenue-generating instrument.

The simulation for this analysis used the “low” property tax rate,<sup>24</sup> meaning revenue projections likely represent a lower-bound estimate.<sup>25</sup>



Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 49. Property tax analysis



Source: United Nations Human Settlements Programme, Nairobi (2018).

Fig. 50. Property tax analysis and project horizon

## 6.6 Analysis of Financing Scenarios

Parking fees and property taxes would generate more than SAR 19.6 million annually while betterment levies would form a secondary option, mobilizing SAR 50 million only once to generate a portion of capital expenditures on public infrastructure.

Public-private sector collaboration through PPPs could provide crucial infrastructure financing for capital expenditures with regards to the public transportation, making the project finance more efficient in the long-term.<sup>26</sup> In addition to PPPs, the estimates produced in the financial feasibility analysis strongly support the use of betterment levies, parking fees, and property taxes. Additional fiscal instruments should be explored in order to fill any existing investment gap. UN-Habitat recommends that Arar continue exploring mechanisms that will strengthen Arar's own-source revenue base.

## 6.7 Conclusion and Policy Recommendations

The policies recommended by UN-Habitat for implementation of the demonstration project are as follows:

- Identify own-source revenue potential based on an approach that integrates urban planning, infrastructure development, and municipal finance

- Foster a holistic approach. PPPs should be focused on linking infrastructure investment and land development, thus maximizing benefits that correspond with mixed land use.
- Estimate the impact of the demonstration project on land value in order to estimate revenue from land value capture own-source revenue mechanisms
- Explore a set of fees that can support Governance to lessen the massive vehicle dependency, increase the use of public transportation and, consequently, the profitability of financial contribution deriving from the private sector in public services delivery
- Generate a diverse portfolio of income stream, implementing different fiscal instruments<sup>27</sup>
- Invest in implementation of diagnostic tools for land information, monitoring systems (e.g., fiscal cadastre) and data collection<sup>28</sup>

The preliminary findings provided in this chapter support the use of land taxes and user fees as part of the core municipal budget in the Kingdom of Saudi Arabia. The introduction of the tax instruments explored in this chapter would contribute significantly to improving local government capacity and, ultimately, reaching the National Transformation Program 2020 (NTP) goals.<sup>29</sup>



Current vacant land next to Highway 85



# 7

## ANNEX



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## 7.3 Notes and References

- 1 Although, Saudi Arabia development policy is oriented to use PPPs for strategic projects at large scale, using Built-Operate-Transfer and other type of agreements (e.g. Prince Mohammad Bin Abdulaziz International Airport, privatization of the operation and maintenance of the King Fahd International Airport of Dammam, Taif international airport), the Demo project gives evidence on the potential returns for urban project at small scale.
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- 17 United Nations Human Settlements Programme (2018), Nairobi, Kenya.
- 18 The Arar's collected own-source revenue is SAR 126,350,000. Approved 2016 Budget for Arar, Ministry of Finance, The Kingdom of Saudi Arabia.
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- 21 United Nations Human Settlements Programme. (2016). Finance for City Leaders, Nairobi, Kenya.
- 22 United Nations Human Settlements Programme. (2013). Property Tax Regimes in East Africa, Nairobi, Kenya.
- 23 The simulation takes account for low rates in order to give evidence on the potential impacts of this financial sources. International



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- Federation of Surveyors. (2016). Property Taxation for Developing Economies. FIG Publication no. 67
- 24 In Singapore, for example, the effective property tax rate is 5.00 percent for owned property and 11.00 percent rented property in 2015 (UN-Habitat. (2016). Leveraging land: land-based finance for local governments. United Nations Human Settlements Programme. Nairobi, Kenya.).
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- 26 National Center for Privatization. (2018). The Privatization Project Manual. The Kingdom of Saudi Arabia.
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