

URBAN HUB DESIGN TOOLKIT

A PRACTITIONERS GUIDE

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A METHODOLOGY AND GUIDELINES

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ACRONYMS

NDP	Neighbourhood Development Programme
CBD	Central Business District
PT	Public Transport
NMT	Non-motorised Transport
PN	Primary Network
SN	Secondary Network
BRT	Bus Rapid Transport
CoCT	City of Cape Town

GLOSSARY OF TERMS AND DEFINITIONS

Urban Network	An urban network is generally comprised of a system of urban corridors and nodes, which are related to a PT network. The NDP's "Urban Network" refers to a combination of two networks at different scales which connect at significant urban nodes belonging to the higher order network. See below for an explanation of the two distinct networks.
Primary Network	The network at the scale of the entire urban area (and crossing municipalities if this is relevant) including the main PT linkages and a limited number of Primary nodes. It also includes the new Urban Hubs which are the subject of this document.
Secondary Network	The network at the scale of the township or a cluster of townships including the linkages to the Primary Urban nodes and a number of lower order nodes.
Local Network	The network at the scale of the Hub and its immediate surrounds. Local connectors will link the Hub to its immediate surrounds.
Urban Hubs	The urban nodes that are the focus of the present exercise, which seek to develop town centres within the township areas. It is the intention that these nodes will function as Primary nodes.
Hub	The area within the boundary defined in Chapter two of this document as the focus of planning.
Precinct	Areas within the Hub that can be planned for independently after Framework planning for

Sub-Precinct	the entire Hub has been undertaken The Sub-precinct in the context of this toolkit refers to smaller portions of the Precincts defined above which can be regarded as focus areas for design and / or implementation purposes.
Access and Movement Network	The network of infrastructural links which facilitate movement of people and cars. Where this network is referred to in the document it refers specifically to the network within the Hub only.
Access and Movement Framework	The framework comprises a framework plan that illustrates diagrammatically in plan how the access and movement infrastructure is aligned and is accompanied by descriptions of the capacity of the PT facilities. It will also talk to the nature of the linear infrastructural links.
Accessibility Zones	Walkable 400 and 800m catchments related to facilities supporting road based forms of Public transport and rail stations respectively.
Interchange Zone	An interchange is where the transport services meet and includes not only the facilities where interchange happens but the environment between these facilities that operate as a large system of connectivity. The Interchange Zone will allow feeder PT services, pedestrians and other dominant forms of NMT, opportunities to connect to the higher order metro wide PT network.
Public Space Network	A connected group of spaces, places and routes that facilitate movement across urban areas but which can also serve a recreational, utility, environmental, social and economic role.

Prioritised Public Space Network	The prioritised links and spaces of the Public Space Network in terms of their centrality and connective capacity between the “Interchange Zone” and the remainder of the Hub Precinct.	Gross Density:	The number of dwelling units per hectare of land calculated over a specified area on the basis of land used for residential purposes and other land uses such as roads, utilities, business, industry, education, transport and parks. Land-extensive land uses such as agricultural, conservation etc. are excluded.
Public Space	Public space includes all land that does not belong to private individuals or institutions and which is accessible to the broader public for circulation, socialising, trading, events etc.	Population Density:	Number of people per hectare calculated by multiplying the number of units by a contextually relevant average household size
Public Realm	Space, outside of the privatised and securitised precincts and buildings which is perceived to be part of a broader shared domain.	Gross base Density:	The average number of dwelling units per hectare across large city areas or the whole city, excluding land-extensive uses such as agricultural and conservation.
Prioritised Pedestrian Network	A portion of the Public Space Network that is prioritised in order to focus movement onto key routes and at strategic points.	Guidelines	Guidelines set broad parameters in which designers and planners can operate to meet particular objectives. They allow for levels of flexibility sufficient to respond to contextual variances.
Activity Route:	A route characterized by strip and/or nodal urban development along portions of the route. They are generally supported by a mix of land uses and higher density development. PT feeder routes connect with the activity routes at frequent intervals. Feeder routes and PT stops interrupt the movement flows creating opportunities for social and economic activities.		
Conceptual Land Use Framework	This Framework comprises a plan that provisionally locates the proposed land use in relation to the access network. The framework is accompanied by a high level Land Use breakdown in which the proposed commercial bulk, residential densities, public facilities, services and amenities for the Hub as a whole is described.		
Nett Density:	The number of dwelling units per hectare of land calculated on the basis of land used for residential purposes only (including residential gardens and privatised off-street parking)		

THE URBAN HUB IN CONTEXT

The eradication of spatial inequality is a national priority in terms of South Africa's National Development Plan. The Neighbourhood Development Programme, through its Urban Networks Strategy supports this by providing grant funding and technical assistance to municipalities for capital projects that will leverage further public and private sector investment in key locations around the country to address the issue of spatial inequality in our cities.

Investment in the Urban Hubs, which are the subject of the toolkit, is one of the NDP's strategies to enable the long term restructuring of our larger urban settlements through targeted investment.

The NDP's approach sees our cities as two distinct but interdependent networks. At the centre of the primary network is the CBD of the city (and there may be a few within a multi-nodal urban system), which functions as the anchor access precinct. A secondary network feeds the primary network. See Figure 1.

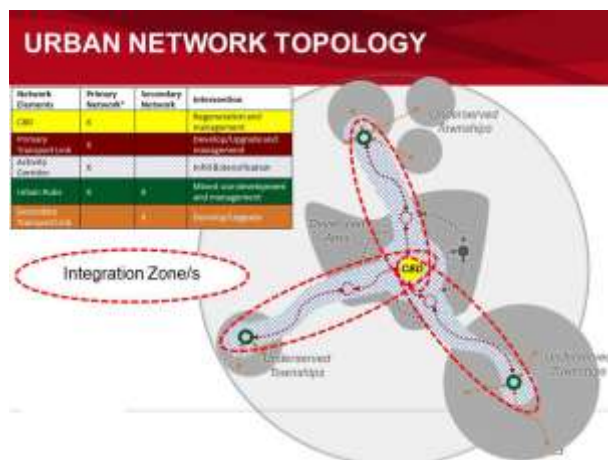


Figure 1: The Urban Network

At the centre of each secondary network is a set of significant urban hubs. These hubs function as **portals** between the secondary networks in a township or group of townships and the primary network of the city, as they offer access via a combination of higher order public transport links, the most important of which is rail (understood to be the backbone of the public transport network) to the established anchor access precincts. They are understood to be the key to creating a seamless network of connectivity across the respective metro areas.

It is these **points of maximum connectivity** that then become the places for logical reinforcement and a concentration of resources if we are to give meaning to the restructuring imperative of the NDP that focuses on more equitable patterns of access through spatial and socio-economic integration. Investment in these hubs will be catalytic with the intention of changing the market dynamics that play themselves out within South African urban settlement areas.



Insert 1: Points of maximum connectivity become points of maximum convergence which become points of maximum opportunity

The hubs will in turn be supported by a network of lower order neighbourhood hubs that will be more embedded and service smaller communities.

As the highest order node within the townships, these hubs will contain the facilities that service not only local residents but those within a more broadly defined area (a region or district) attracting people outside of the area in to be part of a localised economy and community. This is essential to the functioning of large metro areas as a system of interdependent social and economic communities.

The hubs will function as urban service centres and contain a number of important public services combined with commercial activities around a transport hub. They will also be a place of residence. Residential development provides thresholds on which the social, commercial land uses and transport services are reliant besides providing essential levels of vibrancy and increased levels of passive security. Without the residential thresholds and 24-7 occupancy and accessibility, it is unlikely that hubs of this type will succeed.

Town Centres the world over are being re-planned to integrate residential development with other commercial and institutional uses around Public Transport hubs to create more vibrant and sustainable urban environments after a global trend which saw the emptying of central business districts of residents to make way for large scale business developments.

Town Centres historically held symbolic value, becoming meaningful to a range of people who used them over time. They contained spaces of exceptional social, cultural and economic significance but were also spaces where the ordinary day to day needs of residents could be met. The inner city areas were **designed for those on foot**, they had a strong **sense of place** informed by their relationship with the landscape and their ability to reflect and reinforce cultural practises. They were also typically **structured around a robust set of public spaces and places and routes**, which ensured a safe, convenient, secure and comfortable existence for occupants. It should be the intention of these proposed hubs to be

structured around a network of spaces, places and routes that allow a mix of land uses and activities to coexist.

In conclusion the functional role of these new hubs is as a service point, a home, a culturally and socially meaningful domain and an employment / entrepreneurial hub, meeting the needs of the local area, areas beyond the hub and those in transit moving through the Hub.

Key Concepts

It is clear from the description above that there are a number of spatial and structural preconditions that need to be met before the hubs can function as intended. However should these be met the hubs have the potential to address a number of broader issues including but not limited to crime, poverty, low **private sector investor confidence levels and social and economic integration**.

The Toolkit provides three key concepts/ strategies to guide the restructuring of South Africa's outlying Urban Hubs towards a model of vibrant sustainability. These concepts / strategies focus on a combination of structural and spatial issues stressing the importance of tackling issues across the scales and the necessity for the spatial implications of structural actions to be considered at all times.

The first concept focuses on a structural precondition necessary to ensure that the opportunities presented by focussing people in one area are maximised. The second strategy focusses on the need to explore new ways to enable real integration of land uses and compaction. This has structural and spatial implications. The last strategy focusses on the spatial preconditions necessary to create a vibrant, people friendly environment.

THE INTERCHANGE ZONE

An Interchange zone is a point at which a number of public transport services meet. It is a point of high convergence and transfer. The space between the points of PT service is thus a vital component of the overall network of PT service as it facilitates the last level of connection for commuters and others using PT. To understand where and how other land uses can best optimise on these points of high threshold, one needs to understand the Interchange Zone as a set of three related areas - areas of decision, movement and opportunity. The areas of decision relate to the gates and ticket sales areas. The areas of movement are the spaces through which and along which people must move to access the points of entry and exit onto the PT networks. Where the movement routes collide and enter and exit key destinations, areas of opportunity are created. Retail and service related businesses will locate at these points to access the thresholds necessary to sustain their operations. This increases the levels of convenience for users of PT and ensures the Interchange Zone becomes a destination in its own right as a vibrant hub of activity.

The zone will also accommodate residential and institutional development to extend hours of activity and optimise on the opportunities for people to reduce the distances between their live, work and play environments.

INTEGRATED MIXED USE DEVELOPMENT AND HOUSING COMPACTION

While it is necessary to consider public and privately driven land uses separately when conceptualising potential institutional and financial arrangements, it is vitally important to ensure that they are not delivered discreetly from one another on the ground. For the urban environment to function as an integrated and more compact system, one needs to accommodate overlaps. These overlaps make for more efficient transport systems and result in more efficient land and resource utilisation.

New, more compact forms of development, which enable the horizontal and vertical integration of various activities and challenge the present suburban

patterns of low rise standalone pockets of development are essential. Compact arrangements, integrating transport related activities, commercial activities and other public sector driven development in the form of social facilities e.g. clinics, libraries, markets as well as residential development must be explored.

New housing typologies that assist in achieving the required thresholds to support efficient public transport systems will contribute further to the compaction and intensification of the hubs while making more efficient but lively living spaces.

Planning and design of complex integrated land use environments will however require careful consideration of the interfaces between different land uses to mitigate the potential conflicts and incompatibilities that arise.

VIBRANT, PEOPLE-FRIENDLY PUBLIC PLACES

The Hubs must be set up to be crafted over time into centres of social, cultural and economic vibrancy, providing a network of interlinked spaces and places that accommodate a range of activities and people. The spaces and places created must be designed such that the person on foot can meet basic needs comfortably, easily and safely.

The public domain must be designed to respond not only to functional needs but in a manner which facilitates a layering of meaning over time that responds to a broader set of psychological human needs. The focus must be on both qualitative and quantitative aspects of urban performance.

THE URBAN HUB DESIGN TOOLKIT

The Neighbourhood Development Programme unit has developed an Urban Networks Support Guide and Road Map (Refer to the diagram below) with a proposed planning process as well as a number of best practise toolkits and manuals to support infrastructure project pipelining and spatial planning. The Urban Hub Toolkit is one of the supporting Toolkits and describes a methodology to support planning and design of Urban Hubs.

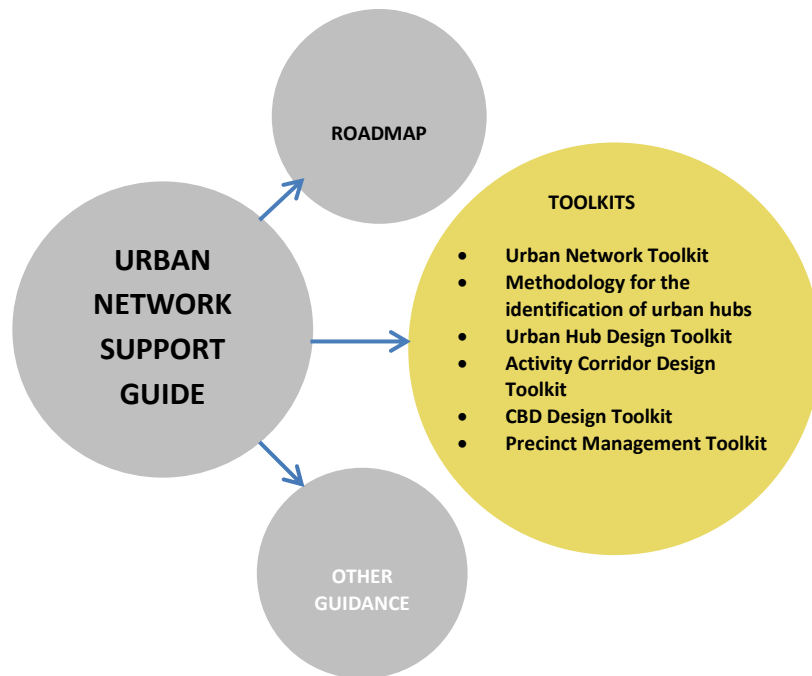


Figure 2: The Urban Network Support Guide

What follows is a methodology to help develop ideas for the realisation of the NDP's new Primary Hubs in the townships. The document suggests how to plan and design the Hub as a Precinct in more detail to inform the Programme Plan and the Project Plan (See Annexure A: Road Map, Nov, 2012) that will identify projects for design development. The document also guides more detailed design phases required to prepare for NDP approvals and costing.

Locating the Urban Hub work within the broader policy framework guiding metropolitan planning

It is the intention that these new hubs along with the Primary and Secondary networks will be identified within the Spatial Development Frameworks as part of the Integrated Development Planning process for the respective metropolitan areas. The implication of this is that the identified Hubs should have the support of communities already.

Further involvement of the public will be allowed for strategically through the first stages of this planning programme in particular the phase in which the primary design informants are identified. Input after this will be agreed upon between the NDP, Project Managers and the public once a programme and list of milestones has been finalised.

Purpose of the Document

This document should serve as a guide for practitioners appointed by municipalities to assist in planning and design of the hubs and simultaneously an evaluation tool for the NDP who will be overseeing the work of the Municipalities.

A Municipal Guide focussed on the process and providing a summary of the content of this document has been developed for Officials use and is available separately on request.

STRUCTURE OF THE DOCUMENT

The structure and content of the toolkit has been informed by an approach which acknowledges the importance of understanding structural – spatial relationships in ordering human activities in space. The toolkit therefore explains the transport, roads and land use planning tasks in detail, as each of the decisions made in respect of these, has implications that affect urban performance. The performance of the public realm in particular is as dependant on the relationship between various land uses and the land uses and transport services as it is on the attention to design of the spaces and streets. The first parts of the toolkit therefore focus on larger scale concerns and the second on the finer scaled level of design consideration both of which are equally as important to the quality of what is realised at the end of the implementation process.

The methodology is structured in a way that allows the main tasks to be undertaken in a sequence informed by this approach, as follows:

- Identification of key opportunities, constraints and challenges;
- Identification of the extent / boundary of the Hub;
- Identification of the character of the Hub;
- Identification of key structuring elements in the form of transport and NMT infrastructure and
- Identification and location of the proposed land use components.

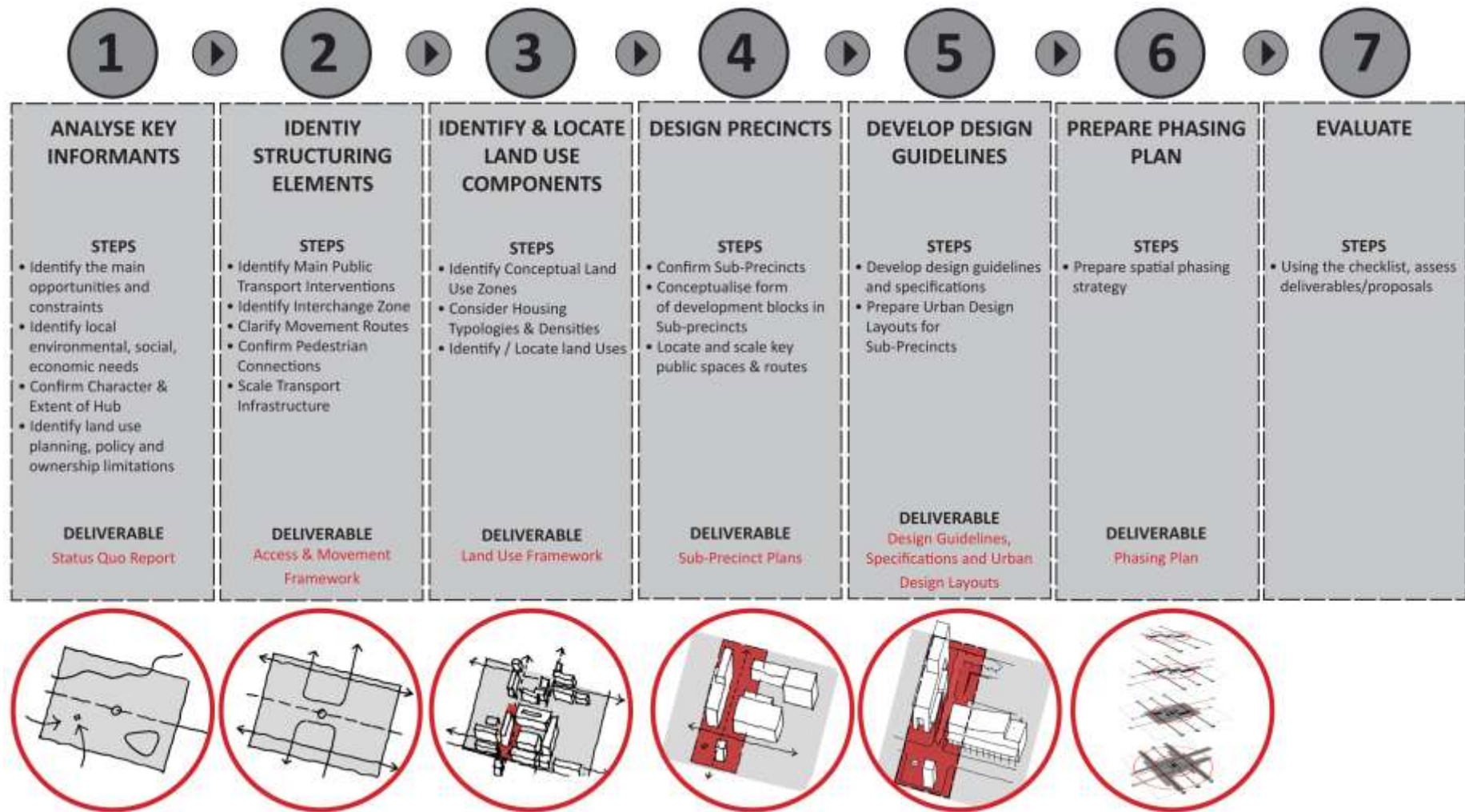
The outcome of this work unpacked in Parts 1-3, will be an **Access and Movement Framework** and a **Conceptual Land Use Framework** for the Urban Hub. A set of guidelines related to each of the tasks will help the practitioner achieve the objectives set by the NDP.

Further detailed design undertaken to produce the **Sub-precinct plans and urban design layouts** is then informed by Part 4 and 5 which focus on urban objectives and design principles.

The second last Chapter of the document discusses phasing and the last Chapter provides a set of Evaluation Criteria which can be used to evaluate whether the core objectives associated to each deliverable have been met.

Note:

While the document is set out as a sequence of tasks associated to key deliverables (see below) it should be remembered at all times that design is an iterative process and that it is likely that multiple tasks will be revisited and the design cycle repeated before final resolution is reached.



PART 1: IDENTIFYING THE KEY SPATIAL INFORMANTS AND LIMITS OF INTERVENTION

DELIVERABLE: STATUS QUO REPORT

OBJECTIVES:

- To prepare a baseline for decision-making on the Urban Hub design
- To understand the main informants to design and planning of the Urban Hub

The toolkit follows on from work that has been completed in locating the Hub, informed by a series of Status Quo Assessments, (see Template A-D on the NDP website). By now one should have a hub location that;

1. has been identified as a significant node for reinforcement within existing applicable policy;
2. is or has the potential to be, a point of high convergence;
3. is or has the capacity to be designed as a fully integrated urban environment that services simultaneously the local residents and residents from the broader metropolitan area;
4. is largely viable from a legal and environmental perspective and
5. has been provisionally defined for the purposes of guiding further scoping.

The Hubs will be developed on a mix of greenfields and brownfields sites. The toolkit has been written to be applicable to both scenarios.

Template E in Annexure B lists the key areas of investigation required to inform this analytical exercise. It requires, as far as possible, the use of existing information in the form of:

- IDP's,
- Spatial Frameworks,
- Transport Studies,
- Environmental Reports,
- Economic Assessments and
- Socio-Economic Surveys.

This does not mean that site visits are not necessary. Site visits are essential for evaluating the current dynamics, spatial qualities and more detailed movement patterns amongst other things but should not result in a duplication of studies.

Consultation of existing communities including the residents, business owners (formal and informal operators), civic organisations etc. is also necessary to inform the analysis and more importantly evaluate the analysis. Consultation will therefore be required through the analytical phase but also just prior to finalising the Status Quo report to ensure that all significant informants and challenges have been identified. This is especially important in a brownfields scenario where future intervention will impact directly on peoples' lives.

The Status Quo report requires a number of tasks to be undertaken, the most important of which are those listed on the following pages. Under each task is a short description of a suggested methodology to be followed to complete the task.

TASK 1: IDENTIFYING THE MAIN OPPORTUNITIES, CONSTRAINTS AND CHALLENGES

Overlay the mapped data and look for the following:

- Patterns associated to the movement of goods and people with a focus on understanding where there is discontinuity in the system in other words begin to identify obstacles and challenges (infrastructure, crime hot spots etc.) to people moving on foot in particular, bearing in mind the core intention of the NDP, which is to create a seamless network of connectivity across the metro area.
- Those things that would limit the extent of land available for new development including ecologically sensitive areas, historically and culturally significant places/areas that have restricted capacity for development, servitudes, building setbacks, land that is already optimally developed ito of the objectives of the NDP.
- Spatial opportunities such as points of high convergence, key destinations, places, spaces and sites of cultural/historical/social significance, open land for development, areas of ecological value and or natural wonder that could be used as amenities.
- Using existing data and material gathered through consultation, describe the localised social, economic and environmental needs.

TASK 2: DEFINING THE PRELIMINARY STUDY AREA BOUNDARIES

Map vacant land, underutilised land (and developed areas that do not meet with the NDP's expectations for the urban hubs) within an 800m radius of an existing and / or potential higher order PT point of connection to the broader metro area. The 800m catchment does not have to be located symmetrically over the PT point but should be located to include areas of existing land use intensity and public transport hubs or routes.

Note the boundary should never be considered a fix as the focus of this toolkit is on facilitating integration and movement. It should rather be used to guide and

focus attention through the first phases of planning. Note, there may be a preliminary and a secondary study area.

TASK 3: CLARIFYING THE CHARACTER / IDENTITY OF THE HUB

Identify those places, spaces, structures, natural features, activities that are unique to the site and define the potential future character of the node, bearing in mind that a community's identity / culture can be strongly associated to place and that a nodes identity can also provide a competitive edge.



CASE STUDY: ORLANDO EKHAYA

The old power station towers have become a draw card to the areas but an icon for the Hub. The Hub will include the redevelopment of this and other old infrastructure into a retail and entertainment centre which is intended to reinforce the hub's role as a leisure and entertainment venue.

TASK 4: GETTING TO GRIPS WITH THE LIMITATIONS OF THE EXISTING ZONING, POLICY AND LAND OWNERSHIP PATTERNS

Identify the main land use planning, policy and land ownership challenges to moving forward based on analysis of the existing zoning, relevant policy and ownership data.

Note:

The land use planning challenges highlighted should not restrict the professionals in answering to the NDP's objectives but serve as a reminder that certain processes may need to be attended to in time to achieve the desired results. However a fragmented ownership pattern must be attended to as soon as possible to prevent a spatially fragmented solution.

PART 2: CONCEPTUALISING THE ACCESS AND MOVEMENT NETWORK

DELIVERABLE: ACCESS AND MOVEMENT FRAMEWORK

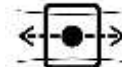
OBJECTIVES:

- To identify what the main public transport intervention should be to achieve seamless connectivity between the local area and the broader Metro network;
- To identify the public transport facilities that will be located within the Hub and what their approximate size / capacity will be. The PT service networks within the Hub and local area will need to be provisionally aligned and facilities identified and located;
- To clarify the scale and alignment of the main movement routes
- To develop a high level concept plan for a pedestrian-friendly Interchange Zone;
- To define a pedestrian network offering improved connectivity between the hub and its local area and within the Hub.

Part 2 is structured as a set of tasks that help to build the Access and Movement Network. The last task is accompanied by a set of guidelines that will help the practitioner to give shape to each of the access and transport infrastructural components of the network.

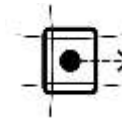
TASK 1: CONNECTING THE HUB TO THE BROADER METRO AREA

Having analysed the existing context in Part 1, one should be able to describe the existing structural condition of the Hub and if necessary (dependant on the level of functionality and lifecycle stage of the node) the ultimate condition you wish to explore in terms of one of the following three main typologies:



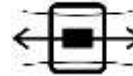
Typology 1: Rail Station as one of a number of points along a rail route

An existing or proposed rail line with a station, feeding road based public transport services running parallel to the rail line.



Typology 2: Rail Station as end point of rail route

An existing or new rail line with end station, feeding road based public transport services running parallel or perpendicular to the rail line.



Typology 3: PT route without support of rail.

A new or existing public transport carrying route feeding other local road based public transport networks

In the case of typology 1 and 2, rail is the dominant mode supported by road based public transport. Typology 3 relies on a BRT service or a robust bus or taxi service to link the hub to the broader metro area. All three endeavour to promote a condition where different PT services run in parallel.

The purpose of identifying the typology is to understand the constraints and opportunities associated with each type which are as follows:

Typology 1:

The rail line is a barrier to movement. Stations however create effective links over the rail reserves for people moving between the various PT services.



Example: Khayelitsha CBD

Typology 2:

The rail line has a reduced barrier effect and there is more opportunity for spatial integration / pedestrian linkage across the Hub itself.



Example: Bridge City

Typology 3:

While this typology doesn't offer the constraints associated with rail lines and reserves it has to accommodate increased numbers of vehicles. A second challenge is the potential scale and form of the route passing through or adjacent to the hub. Large roads can have a barrier effect for those on foot.



Example Orlando Ekhaya

Identifying the typology of the Hub is the first step in the process to understanding how to improve connectivity of the hub to the wider metro area and clarifies the infrastructure required for investment should it not be in place or in a condition to use already.

Task 2 focuses on how to improve connectivity at a local level.

TASK 2: CREATING A SEAMLESS NETWORK OF CONNECTIVITY AT LOCAL LEVEL

In order to promote the Hub as a people friendly environment, proposals should reduce the distance people need to move by vehicle to access key day to day destinations and offer opportunities to access these same destinations by foot as far as possible.

The location of land uses to enable people to work, live and play in close proximity is therefore critical however one cannot deliver the higher order facilities at the same density as the lower order local facilities. PT connections to cover larger distances to access higher order facilities, amenities and services are thus necessary. The PT network, including a combination of road and rail based services, needs to work as an integrated system and be accessible as a system to pedestrians for it to be effective. The strategy is therefore to create an **“Interchange Zone”** within the urban Hubs in which the road and rail based services come together within easy walking distance from one other.

The pedestrian routes between the various PT facilities become areas of great opportunity for retail and service-related businesses due to the high pedestrian count. In combination with a set of public spaces these pedestrian routes provide a network that when extended connects the Interchange Zone, the hub and the area surrounding the Hub.

Conceiving the precinct within which the integration of modes happens as an **“Interchange Zone”** (as opposed to a collection of discreet facilities) will ensure that the constituent PT facilities are integrated into the urban fabric and that opportunities associated to points of high convergence are maximised.



Stratford Interchange, London, United Kingdom

<http://www.tfl.gov.uk/microsites/interchange/94>



Warwick Triangle, Durban, South Africa

Dennis Gilbert, informalcity.co.za

Insert 2: Interchange Zones maximising on the dynamics generated by a convergence of multiple transport facilities.

Structuring the Interchange Zone

To ensure that this “**Interchange Zone**” is usable, understandable and legible, the location of the facilities accommodating the three main modes of PT (rail, bus and taxi) in relation to each other must be carefully considered. They must be located close enough that pedestrians can transfer easily between the three. A maximum distance of separation of modes should be $\pm 150\text{-}200\text{m}$, which translates into approximately 2-3 minutes of walking.¹ As a general rule the main components of the Interchange Zone should be located within a 400m radius catchment area of each other. This 400m catchment area is referred to as the 400m accessibility zone in the explanations to follow. The Interchange Zone will in turn need to be connected to the areas surrounding the Hub by a network of vehicular and NMT linkages.

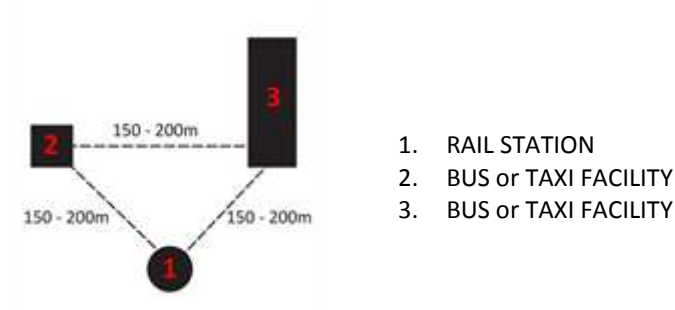


Figure 3: The Interchange Zone components

¹ Determined through an investigation of sites where modal facilities are split



MITCHELLS PLAIN TOWN CENTRE:
Bus, taxi and rail services are provided within walking distance of each other and create opportunities for commercial activity along the links between the respective facilities.

Note:

The Interchange Zone needs to offer basic amenities and services including good way finding, lighting, ablutions, safety, security as well as a sense of place.

TASK 3: DEVELOPING THE ACCESS GRID

Movement networks, which if understood as ‘public right of way networks’ (P1 of Chapter 5.1, CSIR 2000) can be understood as a set of links and junctions providing access to key destinations. Depending on the manner in which the links and junctions associate, the network can be ‘open’ or ‘closed.’ Open systems are not limited by access restrictions related to hierarchies of routes. A multidirectional network (rectilinear grid) has the potential to enable all the positive attributes of an open system (integration, even levels of permeability for a range of users) while still allowing traffic management that addresses the negative aspects related to open systems.

Beyond the necessity to minimise distances between the places of residence and key public destinations including work places, is the need to ensure that the movement network is scaled to allow easy pedestrian movement across the Hub in tandem with easy public transportation services. As has been alluded to above, a rectilinear multidirectional network offers a means to allow an even permeability for both cars and people across a site. Rectangular blocks of 50/60m wide and 150-200m long have worked successfully all over the world especially in cities which provide an effective set of PT services. However block lengths of over 60m can be problematic for pedestrians as they limit permeability and so a finer grained grid for pedestrian movement should optimally be considered where possible.

It is important to note that a grid is not often very regular. It is inevitably warped to respond to topography, natural features and fixed infrastructure etc. In a brownfields scenario, the grid will help to identify where the grain of the movement network is inappropriate and or inefficient.

In a green fields scenario the grid will become a tool to scale and order the site. Overlaying a grid onto a scaled plan of the hub showing the key barriers to movement, demonstrates where connectivity will be restricted but in turn which points within the grid will present the most opportunity.

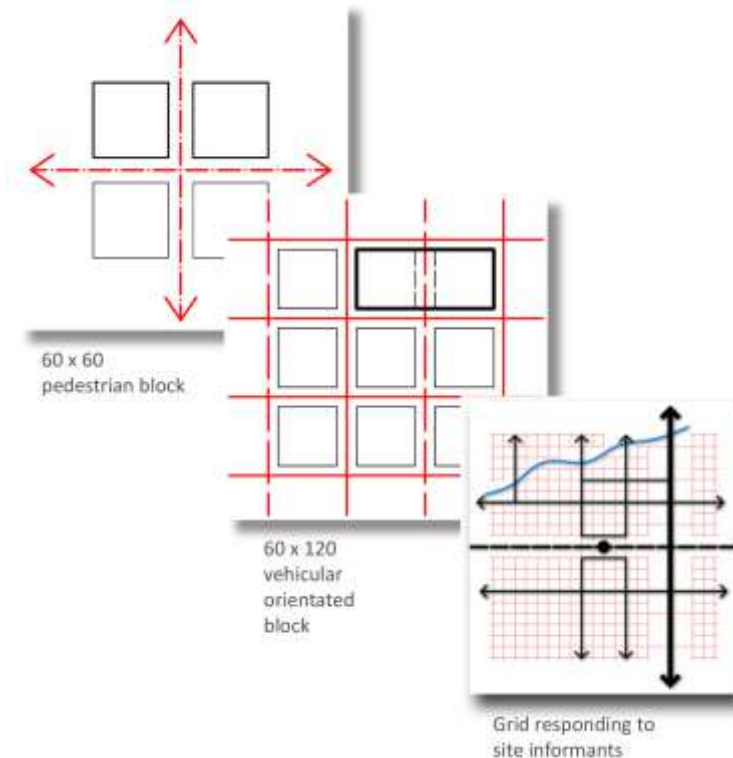


Figure 4: Development of the Access Grid

TASK 4: CREATING A SEAMLESS NETWORK OF CONNECTIVITY FOR PEDESTRIANS

The NDP wish ultimately to see these urban hubs as pedestrianized zones within which there is no need for a car. The intention is that the entire road network will be pedestrian friendly and further that the road network will be integrated with a broader open space system. This is not to say that the roads will all be 'pedestrianized' but that the approach to the road design will be such that pedestrians will always be understood to be a "dominant" user. Sidewalks and road crossings will be generous and roads designed as "spaces" as opposed to "conduits" for traffic.

Pedestrian infrastructure will generally be focussed within an area of 800m from a rail station or other higher order PT facility and 400m from any PT carrying route. However given the need to focus pedestrian movement for commercial maximisation and to increase passive surveillance on strategic routes, it will be necessary to prioritise certain routes within the network for pedestrians. These routes should link strategic points within the hub (PT carrying routes, PT facilities, key public precincts and spaces) but should also include existing routes in the case of brownfields sites that are heavily utilised and link key destinations.

These routes will be referred to collectively as the **prioritised pedestrian network** and will function as a vital component of the Public Space Network. These routes will be the focus of detailed design exercises as a sequence of landscaped links and spaces. Other routes within the network will be designed to accommodate safe pedestrian flows but may receive less investment.

The prioritised pedestrian network will operate at three scales (see Figure 5) however it is important that the scales are not considered in isolation. Pedestrian links within the interchange Zone will remain in-effective as feeders of the broader PT network if they do not allow residents from outside of the interchange Zone and the local area to access the PT facilities.

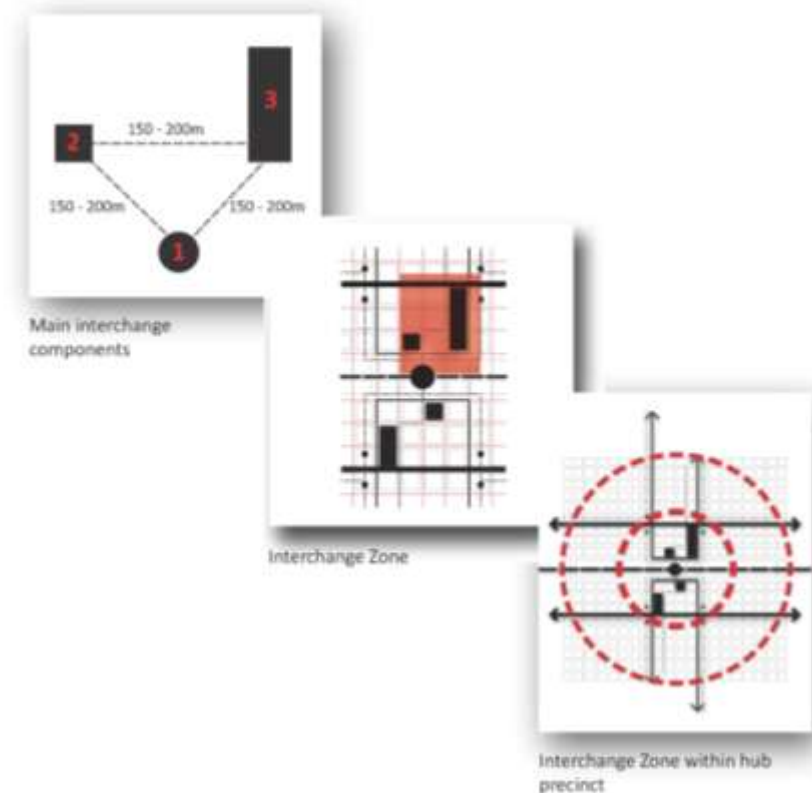


Figure 5: The Scales of pedestrian accessibility

TASK 5: PREPARING THE ACCESS AND MOVEMENT FRAMEWORK

The Access and Movement Framework, comprised of a network plan and associated strategies, must identify how the various PT services will be aligned and relate to each other. To ensure that the network is appropriately scaled for those on foot and aligned to facilitate optimal transportation flows and servicing, it must be informed by considerations of the grid and the concept of the Interchange Zone.

The network will also need to be specific about where and how pedestrian linkage is achieved and improved, how key transport linkages other than PT linkages can be accommodated.

This framework document must be accompanied by descriptions of the capacity of the PT facilities and services as this will affect the scale and nature of the road network supporting them.

In the case of a brownfields site the access network will already be developed but the intention of this step is to question its functionality in view of the Interchange Zone concept and the need to focus on pedestrians.

The document must also identify where and how the proposals differ with the current and proposed local transport policies and indicate what action is required to see that these policies can be revised.

The following section provides a summary of the main considerations and sets out guidelines to help when designing aspects of the Access and Movement Network.

DESIGNING THE COMPONENTS OF THE ACCESS AND MOVEMENT NETWORK

The performance of the Hub is not only dependant on the alignment and the level of service of the road based PT services but also on the form and spatial quality of the infrastructure.

The form and scale of roads often dictates the type of land uses that will locate adjacent to them. The form and location of the infrastructure will dictate what potential they hold to support a range of other land uses.

Where the infrastructure will be new, one must conceptualise how the infrastructure can best accommodate the type of land uses and activities necessary to create a comfortable people friendly network of spaces and places. Where the infrastructure exists it is important to interrogate whether its existing form responds to the NDP's vision of a people and commuter friendly environment. If it doesn't, then design revisions must be considered.

A set of key considerations and guidelines to be used when designing or redesigning the respective components of the access network follow:

RAIL INFRASTRUCTURE

Rail Lines

Rail lines connect effectively at metropolitan level but are spatially divisive elements restricting access connectivity on the ground at a local level. Rail stations are more often than not surrounded by vacant land and one sided in their focus.

Bridging the reserves is critical but needs to be done in a considered way to make the links spatially meaningful for people on foot. Air rights over rail reserves at stations must be discussed for their potential to address the barrier quality of the rail lines. Vacant land around station precinct reserved for rail purposes must be investigated for its potential to be redeveloped.

Rail Stations

While the rail lines themselves are spatially divisive and limit access, the rail stations provide an opportunity to integrate opposing sides of the lines. Overhead facilities in particular can improve universal accessibility, the security of pedestrians and rationalised commuter operations.

Rail stations also present numerous opportunities as a result of the fact that they have such large numbers of people moving through them on a daily basis. However they have generally been designed to operate in isolation from the surrounding urban environment. Their public interfaces are blank and attract anti-social activity instead of offering access to high thresholds of people for economic operators and space for the public sector to offer much needed services to large numbers of people.

It is critically important that rail station designs and layouts are informed by the following to ensure they make the most of their strategic locations in relation to the flows of people.

Guidelines:

- The station should be maximised for commercial land uses that need exposure to regular flows of people on foot on a daily basis. This will require a broad group of stakeholders including the private sector to come on board when conceptualising rail station precincts.
- Stations should be designed as an extension of the surrounding urban fabric and not as discreet precincts. Furthermore the movement path over the rail should be considered a priority pedestrian link at the level of the Hub and as such be designed as an integral part of the Interchange Zone and prioritised pedestrian network.
- The station interfaces must create forecourts on both sides of the rail.
- Key destinations should be located on either side of the rail line to ensure the movement dynamic across the rail lines is balanced and the station can contribute to integration at a local level.



CASE STUDY: STATION PLAZA, MITCHELLS PLAIN
Maximising the opportunities associated to a point of high convergence. The rail station is developed as a commercial and institutional service centre.

ROAD INFRASTRUCTURE

Road networks will be comprised of a hierarchy of different routes connecting at different scales including those belonging to the Primary Network, those belonging to the Secondary Network and those belonging to the local Network surrounding the Hub. For the purposes of this programme the Hub road network should be understood to comprise of the following:

Road hierarchies

Primary PT connectors

The Primary PT connectors are typically of two distinct types. The first is a road of a very high order designed to accommodate large volumes of high speed vehicles including BRT services. These routes are typically wide with restricted access points. Service roads running parallel to the main route therefore typically provide access to larger properties adjacent to the route. This arrangement, which is dominated by road surface, is generally people unfriendly. Where the vehicle flows are disrupted and PT services are intercepted / stopped, there is potential to maximise on the thresholds generated by a disruption in high traffic and resulting people flows.

Guidelines:

- Where these mobility focussed routes pass through the Hubs they should be pinched to slow traffic and allow increased levels of transfer and interaction. At these points they can be treated as secondary connectors. See Figure 6.

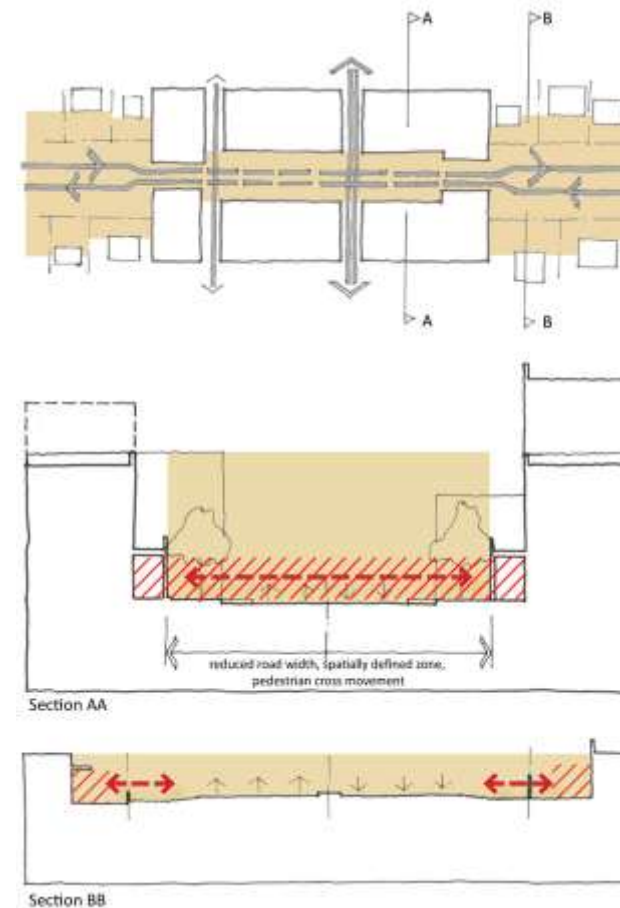


Figure 6: Creating pinch points

Secondary PT connectors

These routes typically connect surrounding local areas and carry high frequency PT services. They are stop-start in nature and attract a mix of land uses and intense levels of pedestrian activity along their length but particularly around the PT service points.

Local PT connectors

These routes feed the Secondary connectors. They carry lower volumes of public transport but generally accommodate levels of intense land use activity. They should accommodate cycling and pedestrian facilities.

Guidelines:

- These routes must be supported by a mix of land uses that increase thresholds and levels of human interaction and provide sufficient bulk with which to spatially define the route as a people space. The bulk necessary to achieve spatial definition will be related to the width of the road.
- They must accommodate cycling facilities where they constitute part of a prioritised network for pedestrians.
- Pedestrian facilities must include frequent crossing points and generous sidewalks that provide space for street vending and hospitality trades to spill out.
- Landscaping must add value to the sidewalk spaces as slow, interactive people spaces.
- Landscaping, must define special places along the route including forecourts to significant public destinations and public transport stops.

Road based Public Transport facilities

Depending on the order and scale of the road in question, PT facilities are handled differently. Facilities are typically grouped into those of a higher order that are separated from the main traffic flows and those that are integrated with the dominant traffic flows as follows:

On-street PT stops

On-street PT stops can be categorised broadly into structured stops (separate lanes in the direction of main traffic flow) and the smaller stand-alone shelters. The order of stop is dependent on the vehicle, service frequency and volumes of the PT service. The following provides guidelines to ensure that on-street stops contribute to the quality of the overall environment.

Guidelines:

- On street PT stops must provide as a minimum, shelter from the rain and sun, seating, lighting, service information, access to convenience shopping, safe and generous prioritised crossing for pedestrians.
- On Street PT shelter structures must contribute to definition of localised spaces.
- On street PT stops must associate where possible to important public destinations or main retail / public service points.
- On street PT stops must locate opposite each other to ensure that road crossings can be shared at strategic points.

Off-street PT facilities

The size of these PT facilities is dependent on the role of each within the local network and vehicle volumes / passenger numbers among other things. There are generally two types of off-street facilities, a) destination terminals which are generally located within employment nodes, educational or institutional hubs and b) transfer facilities which function as transfer points from one mode to another. Destination terminals tend to be most busy through the morning and evening peak periods but there is some activity through the day in the off peak.

Transfer facilities are generally mostly busy through the morning and evening peaks only.

Guidelines:

- Volumes and frequencies of vehicles at these facilities can change so facilities should be designed to accommodate potential growth and alternative land uses, should volumes decrease.
- Bus and Taxi facilities should be located in close proximity to key public facilities and services given the high levels of access they provide.
- The bus and taxi facilities should be maximised for commercial land uses that need exposure to regular flows of people on foot on a daily basis. This will require a broad group of stakeholders including the Private sector to come on board when conceptualising these facilities.
- Bus and Taxi facilities should be spatially integrated with their surrounds.
- Where bus and taxi facility activity is internalised (housed within a structure), the edges should be activated and the pedestrian flows in and out maximised for a range of commercial operators.
- Where bus and taxi facilities are designed as open air facilities, they must be located within a space that can offer adequate definition. These spaces should in turn be designed as far as possible as an extension of the Open Space Network with activated edges.
- Holding Areas for taxis and buses are space extensive and not conducive to creating a vibrant and safe precinct. They should be located remotely where they do not limit people flows or restrict exposure to these flows for economic operators.
- Regional facilities can be integrated into the centralised Interchange Zone but not at the expense of the quality of the environment as a mixed use urban hub.



Activated edges of Metro Mall, Johannesburg, where the PT interchange is separated from the main traffic flows and accommodated within a city block. Note the edges of the block are released for commercial operators.



The buildings that define the edge of the 'open air' PT interchange at Claremont Rail Station, Cape Town provide opportunities for commercial and institutional operators.

Insert 3: Road based public transport facilities

PEDESTRIAN AND CYCLING INFRASTRUCTURE

For the purposes of this high level set of guidelines, only pedestrian and cycling infrastructure has been considered. Where particular sites have other forms of NMT these should be incorporated into the overall network after careful assessment of their needs.

Pedestrian infrastructure

All routes within the Hub should be designed to accommodate safe pedestrian flows although there will be prioritised pedestrian network aligned with the dominant desire lines.

Regardless of where in the network you are, the following should be taken into account when designing for pedestrians:

Guidelines:

- Pedestrian networks should address the needs of the disabled, the young, the elderly and those moving with young children.
- Pedestrians should be prioritised where they cross vehicular flows in large volumes within intense urban environments.
- Road crossing facilities should be 'announced.' The surrounding built fabric and landscaping should express and reinforce the crossing area as a space.
- Road crossings should be designed as wide pedestrian 'zones' as opposed to narrow crossings.
- Spaces at either end of road crossing points should be designed generously.
- Pedestrians should be kept at grade where possible, i.e. avoid forcing people onto pedestrian bridges or into subways.



Insert 4: Design should ensure that pedestrians are prioritised over vehicles within the intensely active parts of the Interchange Zone

Cycling infrastructure

Cycling can drastically reduce travel times and by default extend the distances people are prepared to travel to access basic services, work, school etc. Cyclists will comfortably travel 8-10km to access work, schools and public transport services. Cycling by residents within the Hub and outside of the Hub should be as far as possible facilitated on the proposed road network or at least along a prioritised set of routes between key points as proposed for the pedestrians. Cycle lanes can be accommodated on the road with traffic, in a separate lane, as part of the sidewalk or away from the road depending on the space constraints, volumes of traffic and cyclists; and the competency of the user group. The following should be taken into account when designing for cyclists:

Guidelines:

- Safe and secure bicycle parking is essential at all key destinations.
- If public transport vehicles are not at the point of being able to accept bicycles, then bicycle parking is critical at the respective modal facilities.
- Along busy cycling routes minimise driveways that cause conflict.

PART 3: CONCEPTUALISING THE LAND USE COMPONENTS

DELIVERABLE: CONCEPTUAL LAND USE FRAMEWORK

OBJECTIVES:

- To identify broad land use character zones
- To conceptualise housing typologies required to achieve the required densities in each Conceptual Land Use Zone
- To identify the main land uses within the Hub and locate them in relation to the proposed Access and Movement Framework

Part 3 is structured as a set of tasks. The first task ensures that the Land Use Framework, conceptualised as a set of layers, is informed by the Access and Movement Network. Part 3: Tasks 2 to 5 explain how one would go about conceptualising each of the main groups of land uses as layers. Each task has a set of guidelines based on the key objectives of the NDP.

TASK 1: IDENTIFYING THE LAND USE CHARACTER ZONES

Public Transport systems only become viable when the land use mix and its related intensity and density can create sufficient thresholds. The purpose behind the NDP's programme is to use PT to begin to restructure our cities. This then requires careful consideration of how and where land uses locate in relation to PT services on the ground.

Conceiving the hub as a set of three interdependent land use character zones related to different components of the public transport network enables one to ensure that land uses and transport are conceived as a system. The three zones include the following:

- **The Heart** associated with the Interchange Zone
- **The Active Corridor Zones** associated with the corridors that pass through the hub
- **The Transition Zones** which is the area remaining that doesn't relate to any higher order PT service or route

Annexure D is a tool for the purposes of more detailed land use planning within the hub and provides planning parameters for each of the Zones identified above. The descriptions to follow are useful in understanding quickly what type of land uses could locate optimally in each zone

The Heart

The Heart is considered to be the central, most public, most dense and most intense area within the Hub. It will include the “Interchange Zone” and its immediate surrounds. It is where the key higher order public destinations such as district hospitals, magistrates’ courts, training colleges; government offices, civic square etc. will be located. The Interchange Zone will allow safe comfortable pedestrian linkage between the rail station and other PT facilities and these facilities and other key public spaces. It will accommodate the busiest pedestrian spaces in the Hub. This area will as a result be the perfect location for a full range of economic operators to be accommodated. It should also accommodate some residential development above ground level to ensure 24-7 activity and surveillance. Parking requirements to support activities in this zone should be zero to minimal given its proximity to public transport services.

Remember that the identity / character of the hub should inform the type of activities that locate in the Heart.

The Active Corridor Zones

The Active Corridor Zones relate to the Secondary and Primary Connectors located within or adjacent to the Hub. Where they are associated to rail or higher order road links, nodal development will be more appropriate. Where they are associated to activity routes, the development will be more linear.

Businesses and manufacturing will be permitted in these zones. Manufacturing and / or light industrial could be considered along the rail reserve, and business should be accommodated along activity routes or nodes. Ground floors along the key thoroughfares should be occupied by activities that can be active at least 16 hours / day. Parking requirements to support activities in this zone should be minimised given their proximity to public transport services.

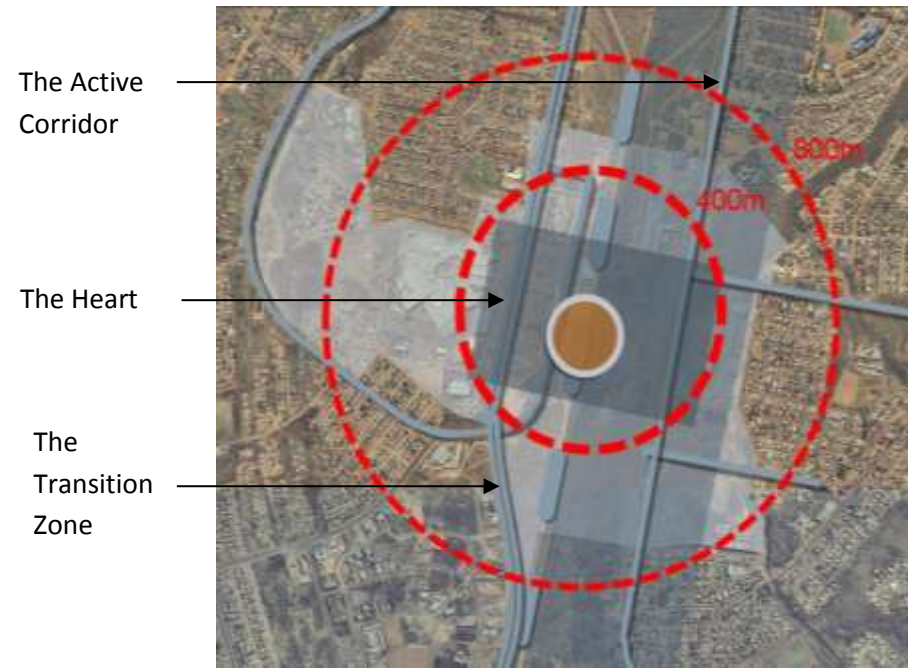
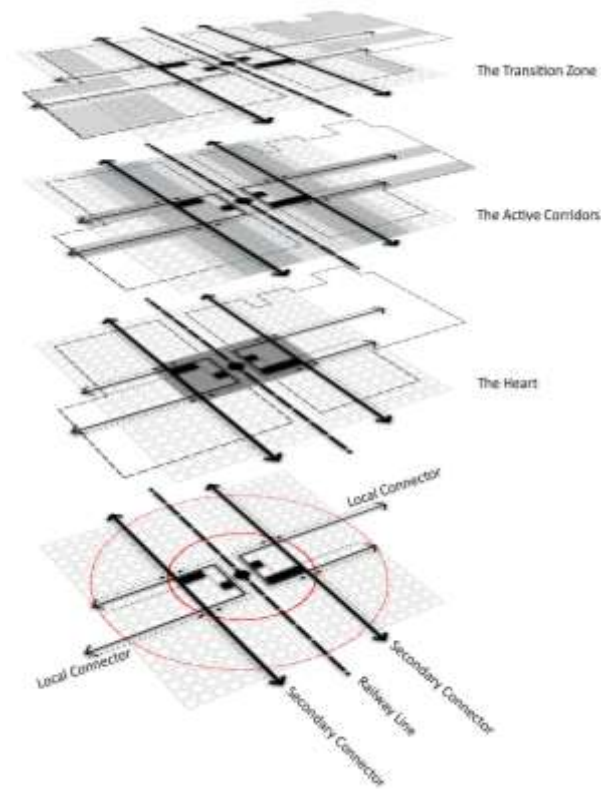
The Transition Zone

This zone primary role is to mediate between The Heart, Corridor Zones and the surrounds. This zone will be the least dense, least intense and accommodate the most land extensive of the activities. On the other hand it would not be optimal to see this zone handle all the parking for the Hub.

It should also accommodate activities that encourage residents in the surrounding areas to move into the Hub and spaces which accommodate existing urban operators who cannot be accommodated in the more intensely developed zones.

NOTE:

Conceptualising the hub as a set of three zones is a tool and should not be used prescriptively to define development precincts. The zones will respond to the contextual realities on the ground and overlap geographically and functionally in parts.



CASE STUDY: MABOPANE
 At Mabopane the Active Corridor runs parallel and East of the rail line. The Active Heart Zone crosses the Rail line to incorporate what could be an Interchange Zone in the future. The remaining underutilised land is identified as transitional in nature mitigating between the core of the Hub and the existing surrounding fabric.

Figure 7: Land Use Character Zones helping to reinforce the relationship between land uses and public transport

TASK 2: IDENTIFYING AND LOCATING THE PUBLIC FACILITIES AND AMENITIES

The public services / facilities provide the building blocks of any settlement. They give the settlement meaning by addressing needs related to health, education, security and social well-being. Included in this group of important land uses are the places that hold significance to the community as spaces of gathering, contestation, celebration, expression, relaxation, reflection. These can be hard spaces and or soft green spaces typically referred to collectively as the Open Space Network which will also include the spaces associated to key topographical and hydrological features such as water bodies, rivers, high points etc.

Number and Type:

In order to estimate the number of facilities/services/amenities required to be accommodated within the hub, one must utilise provision standards². The need for higher order regional and district scale facilities will be established in the analysis phase expanded on in Part 1.

For local scale facilities it will be necessary to first calculate the estimated local population. Using a catchment area of 200ha based on a feeder radius of 800m from the key PT service hub, an average gross density of 119du/ha and an average household size of 3.1 people³ one arrives at a generic estimated population of ±74 000.

² Use local standards where they are available. Where they are not, refer to the CSIR (Argue, TC and Green, CA) August 2012. Guidelines for the Provision of Social Facilities in South African Settlements First Edition

³ This figure is an average household size for the 8 metropolitan municipalities, extracted from Statistics South Africa, 2011 Census

The list of facilities and amenities defined through the preceding exercise must then be tested against realities on the ground.⁴

Guidelines:

- Public facilities and amenities should be located strategically within the hub in relation to the community they are serving. The highest order facilities servicing the broader metropolitan community should be located within if not close to the Interchange Zone. Facilities servicing local communities must be located on PT routes. The last level of facility will be embedded within the Hub but in relation to key pedestrian links. Table 1 clarifies the levels of accessibility associated to each scale/ order of facility provision.
- Notwithstanding the guideline above it is not suitable to locate land intensive facilities such as large sporting grounds for example within The Heart. Land intensive facilities/amenities should be located outside of the Interchange Zones and Active Corridor Zones if they cannot be designed to be less land intensive.
- Where facilities/amenities can co-locate to allow the sharing of specific spaces and resources this should be facilitated. However, clustering and sharing of resources between facilities can only be done when there is compatibility between activities. For example schools, libraries and recreational and community facilities can be clustered but police stations and hospitals handling emergency / trauma related activities and other high risk activities cannot be easily clustered with other social facilities.
- These land uses should assist in activating streets and urban spaces by locating and making visible their public activities at ground floor .

⁴ When identifying the facilities that may need to be provided within the hub it should be borne in mind that the provision standards proposed by the CSIR will be tempered by realities on the ground such as mobility factors which are influenced in turn by affordability levels and movement barriers (large vacant areas, rail lines etc.)

- Facilities handling emergency services must be located in highly accessible locations outside of intense activity zones that would prevent easy entry and exit for emergency vehicles.

The following diagrams locate a collection of facilities / amenities in relation to the proposed Access and Movement Network and an Open Space Network. They show a number of key higher order facilities locating within the **Interchange Zone** and other lower order facilities along the Secondary and Local Connectors and green corridors.

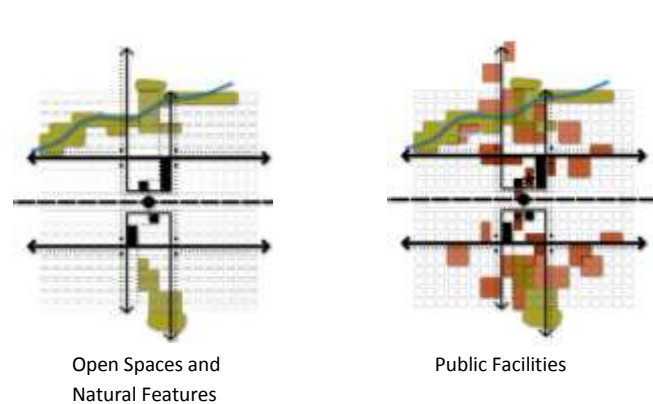


Figure 8: Locating the public facilities and amenities

TASK 3: LOCATING COMMERCIAL LAND USES

RETAIL ACTIVITIES

The NDP will be looking to support innovative forms of retail development that challenge stand-alone mall type configurations to become less exclusive and more 'of the city'. The proposal is that commercial activities be integrated with other land uses such as public transport, institutions and residential development. It is also the intention to ensure that new commercial development responds more directly to the pedestrian and commuter flows within the broader urban environment and in so doing provides opportunities for a broader cross section of operators from the very small to large national chains.

Given the intention to invest in PT; there will be opportunities to develop without massive investment in parking areas and structures. This will give designers the opportunity to reconceptualise the form of commercial development which is presently dictated by the parking requirements of the respective Zoning Schemes.

The analysis undertaken in Part 1 may have identified points and routes where informal and formal businesses have agglomerated already and these in combination with the proposed Access and Movement Network should provide clues as to where thresholds will be high enough to support new commercial development or consolidation of existing formal and informal commercial activity. These activities will locate across the three Land use Character Zones with the highest number of operators associating to The Heart and Active Corridor Zones to maximise on the thresholds generated by Public Transport.

Guidelines:

- Retail centres regardless of scale and type should be located in highly accessible locations such as along PT routes, around PT facilities and within the Interchange Zone.
- Small scale vendors must be located closest to high threshold spaces.
- Strategies to ensure that the smallest scale vendors have access to a full range of basic and affordable spaces, units, and / or services must be developed. This must be informed by engagement with the full range of stakeholders including the vendors themselves.
- Commercial environments should allow the formal and informal economy to operate side by side however the interface between the two must be carefully considered from a spatial and management perspective.
- Commercial development should allow for the agglomeration of similar type products and services.
- Retail environments should locate tenants carefully to ensure that operational hours are extended in certain strategic locations. Restaurants, internet cafes, libraries etc. can extend the operational hours to 18 hours / 7 days a week which is preferable for areas related to transport facilities or key public spaces.
- Large anchor tenants should where possible, be located behind an edge of smaller scale commercial operators fronting onto public spaces and roads. (See Chapter 4 for conceptual approach to handling a range of operators.)
- Retail environments should not enclose and / or securitise precincts larger than an average 60x60 block. If they do, the public roads are to be respected as public 'rights of way.' These public 'rights of way' can be roofed but they cannot be managed / controlled to restrict access. See diagrams below.

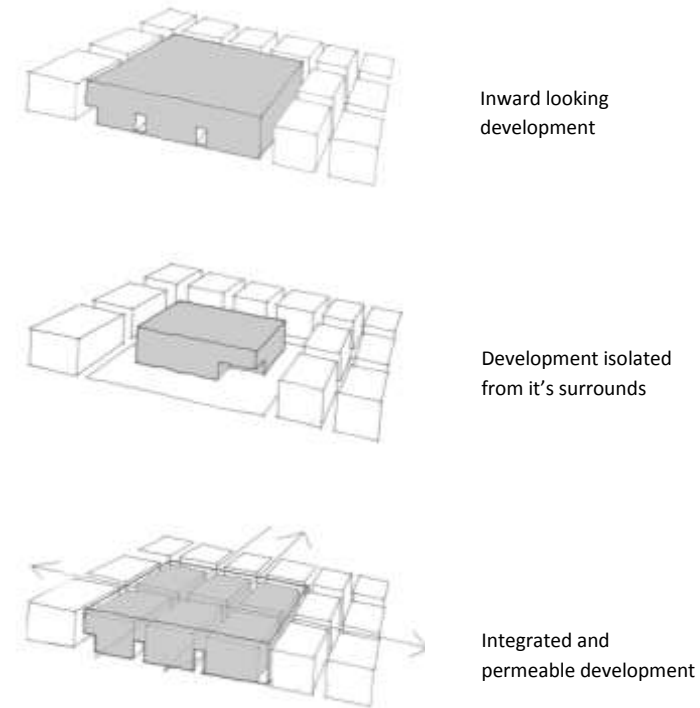


Figure 9: Optimal Retail configuration within an urban environment

- The scale of the saleable / lettable modules within commercial precincts should allow for a full range of operators including the following:
 - Large retail operators who typically locate in commercial centres of between 14 000m² and about 25 000m². These operators prefer to locate with other large anchor tenants and banking institutions in the larger centres but can stand alone as anchors with smaller tenants in the smaller centres. The smaller centres typically cannot support banking institutions (Isandla Institute, 2011)
 - Smaller retail and service related operators who locate themselves in highly accessible locations but more affordable locations outside mall developments along the busier pedestrian routes.
 - Street vendors who locate where thresholds are high, typically in areas associated to Public Transport facilities or alongside larger retail operators. Street traders operate from a variety of different structures including roofed, secured and serviced spaces. Municipalities need to invest in or go into partnerships with the private sector to provide the necessary storage, canopies, lighting, security, water, power. The Hubs should also allow itinerant trading in places to provide opportunities for those entering the sector at the lowest end.

OFFICE DEVELOPMENT

Office type developments logically locate where other key office developments locate. Large businesses don't always require interfacing directly with the public in the same way that retail does. They frequently require privacy and security and for this reason locate above ground level. Notwithstanding this they will locate mainly within The Heart.

Guidelines:

- Where offices are located on ground floor they need to activate the street or public space onto which they front or alternatively locate behind banks of smaller scale operators to ensure the public interfaces are activated. (See Chapter 4 for conceptual approach in handling block scale development)

- Offices should be integrated with other land uses in particular public transport and institutional development.
- Where business is integrated with residential it should be of a finer grain, i.e. smaller spaces where work spaces are connected to living spaces directly e.g. loft studios etc.

INDUSTRIAL / MANUFACTURING ACTIVITIES

The market and the context normally inform the type, size and extent of the spaces required for industrial type land uses. While market demand is generally for large serviced sites within a secure 'Park', the demand in townships is often for smaller manufacturing and / or warehousing businesses premises. Industrial / manufacturing development within the Hubs must therefore ensure that a full range of industrial manufacturing premises are provided including a range of small spaces that have access to water, power and security.

Development that responds to the recent trend of combining living spaces (lofts in particular) and workshop spaces for the creative industries should also be incorporated into the central parts of the Hub to create options for working from home.

An ideal location for 'less clean' industrial activities may be hard up against the rail line, which is generally less optimal for other uses or outside The Heart and Active Corridor Zones.

Guidelines:

- Where large Industrial estates are considered they must not be developed at a scale which restricts pedestrian movement through the Hub but rather within the urban block that can be secured if necessary by buildings.
- Where industrial manufacturing precincts are being considered, they should be designed to add value to the public streets as a component of the public spatial network and as a result should look to more urban building types and layouts.

- Industrial activities should be limited to clean / light manufacturing which is compatible with residential uses.
- Locate large industrial sites closer to the primary connectors and away from The Heart being the most intense urban zone.
- Locate manufacturing alongside retail to allow smaller operators the opportunity to produce and sell from the same location.

The following diagrams locate the various forms of commercial development in relation to the proposed Access and Movement Network. They propose key destination retail and service developments locate close to the key PT facilities within the Interchange Zone. Retail, office and service related activities must also locate to support the key PT and pedestrian routes which will include the Secondary Connectors and Local Connectors servicing the local residential populations. Industrial activities must be located strategically away from dense residential areas, and highly active central zones which should attract more land intensive land uses.

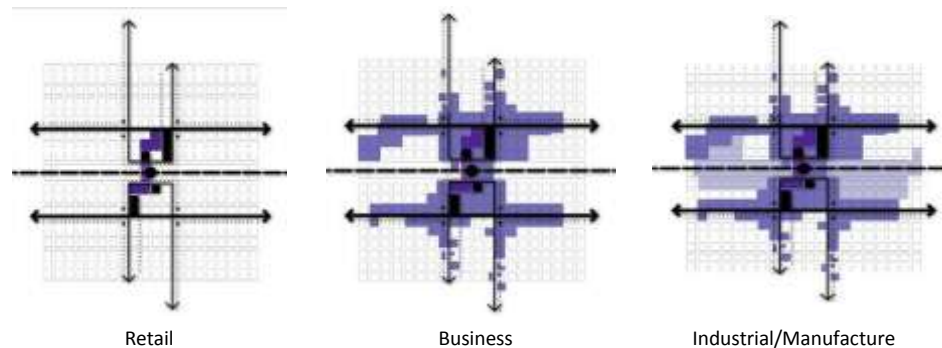


Figure 10: Retail, Business and Industrial / Manufacturing activities locating in relation to levels of exposure and accessibility offered by respective components of Access and Movement Network

TASK 4: IDENTIFYING AND LOCATING APPROPRIATE HOUSING TYPOLOGIES

Thresholds are critical to ensure that public transport services are viable⁵ but also to create a vibrant living environment. This section focuses on density as a means to increase thresholds and vibrancy.

An average base gross density across the entire urban area of 25du/ha (PG:WC, 2009) is necessary to support a reliable public transport system according to international standards. Within a metropolitan and / or sub-metropolitan hub in the vicinity of public transport routes, interchanges and stations, near civic precincts, and where there is a diverse concentrated mix of land uses, activities and services, a density of 100-375 du/ha (net) is preferable (CoCT, 2012). This translates into a gross density of approximately 50-187du/ha⁶, and an average gross density of 119du/ha. This is relatively high and will result in residential development of between 4 and 7 storeys, and higher in the long term.

To achieve medium densities one will need to stack units over a minimum of 2 to 4 storeys but varying densities will have different spatial and physical manifestations. Residential development located on the periphery of the urban blocks around semi-private courtyards will generally create better defined street spaces and more vibrant public spaces. Medium densities can also be achieved through row housing where all units have ground level entry.

⁵ A ridership of 40 000 passengers in each direction daily is said to support a rail or dedicated public transport route such as the BRT. This offers a guide as to the optimal densities to achieve within the hub and its immediate surrounds. Public Transport viability can also be related to employment density. The CSIR (2000) suggests that ridership increases significantly when you reach a threshold of 1 employer / 100m² in a centre with more than 10 000 jobs. This is an incentive to create jobs as well as shopping opportunities within the hub.

⁶ Based on an assumption that gross densities are about half of net densities

Given the starting point of many of the Hubs, it will be necessary to provide a mix of building and/or dwelling/unit types including a mix of tenure forms (e.g. ownership, rent-to-buy and rental units) and a mix of income groups across the Land Use Character Zones. Residential within The Heart and the Active Corridor Zones will typically attract smaller size units to optimise on places of highest accessibility. Larger dwelling units and less dense housing development will locate further away from The Heart and the Corridor Zones.

The images on the following page provide examples of housing forms where medium to higher densities are achieved.

Guidelines:

- Ensure that there are a range of tenure and accommodation types provided for within each development and an appropriate split over the Hub in response to the needs identified in Part 1
- Provide a range of live-work opportunities close to activity routes and within the Interchange Zone.
- Locate higher density developments close to the main transport routes, facilities and within the Interchange Zone reducing the need to for parking.
- Do not locate residential development close to potential annoyances such as dirty and or loud or polluting industrial activity.
- Integrate residential development with other land uses to activate ground floors, offer relief space and increase levels of service to local residents. The mix of land uses can be achieved vertically or horizontally.
- Provide sufficient space to accommodate a transition zone between the public and private domains. This is especially important in dense and intense environments.
- Locate residential development around key public spaces and places to activate and increase passive surveillance over the public domain



Insert 5: Medium to high density housing

TASK 5: CLARIFYING PARKING AND EMERGENCY SERVICES REQUIREMENTS

Parking can be one of the largest consumers of space in cities and can negatively affect the quality of environments. By structuring development around public transport services, one can reduce the need for cars and parking. The Hubs must be set up as 'Special Zones' where parking requirements in the respective zoning schemes are reduced. Beyond this one has to employ design to mitigate the visual impact and ensure that the parking does not create a sterile and socially inactive precinct.

Emergency services must be accommodated within the Hubs in locations that allow quick ingress and egress. They should therefore if possible be located outside of the busiest PT and pedestrian zones although this must be considered against the need. The most dense and intense areas may need satellite services that rely on smaller vehicles and foot access.

Guidelines:

- Provide limited convenience parking on street but not in continuous bands as continuous car parking forms a barrier to movement across the street.
 - Provide basement parking where possible but limit the size of the entrances and exits as far as possible as they sterilise block edges.
 - Provide parking associated to activity corridors behind the first layer of commercial / public land uses in landscaped parking courts.
 - Minimise the visual and environmental impact of parking by limiting the size of parking areas, planting trees and reducing the amount of hard surfacing.
 - Where associated to residential areas and / or higher order public facilities, parking areas should be designed as multifunctional spaces e.g. play courts or markets when not in use for parking.
 - Avoid 'structured' parking within the first two levels above ground to prevent sterile public interfaces.
- Cluster public facilities and amenities to help reduce the total extent of parking required especially when activities can be staggered over the day or night.
 - Consider putting in place strategies to limit loading, off-loading and servicing to non-peak times. This allows the use of road edges through the day for other activities including trading, cafes, social activity, public transport services and parking.

TASK 6: FINALISING THE CONCEPTUAL LAND USE FRAMEWORK

The Framework should be understood as a plan comprising a set of layers where **overlaps are essential to ensure integrated development**. The plan should reveal a logic that sees the Active Corridor and The Heart zones attract the highest density of land use activity and the most land use overlaps.

The framework plan must be accompanied by a high level Land Use breakdown in which the proposed commercial bulk, residential densities, public facilities, services and amenities for the Hub as a whole are described.

The Framework document must at this point also be able to identify whether the proposed land uses, densities, bulk and parking are in accordance with the relevant town planning scheme parameters. Should they not be, strategies to establish alternative parameters including the creation of overlay zones should be identified for potential consideration.

Part 4 will suggest how one can accommodate a layering of land uses in a way that optimises urban performance and allows the NDP's key objectives to be met. While the Land Use layering can ensure the complexity required to support an efficient and meaningful urban environment it is in the shaping of the interfaces between various land uses, and the buildings and the streets and open spaces that urban performance is maximised.

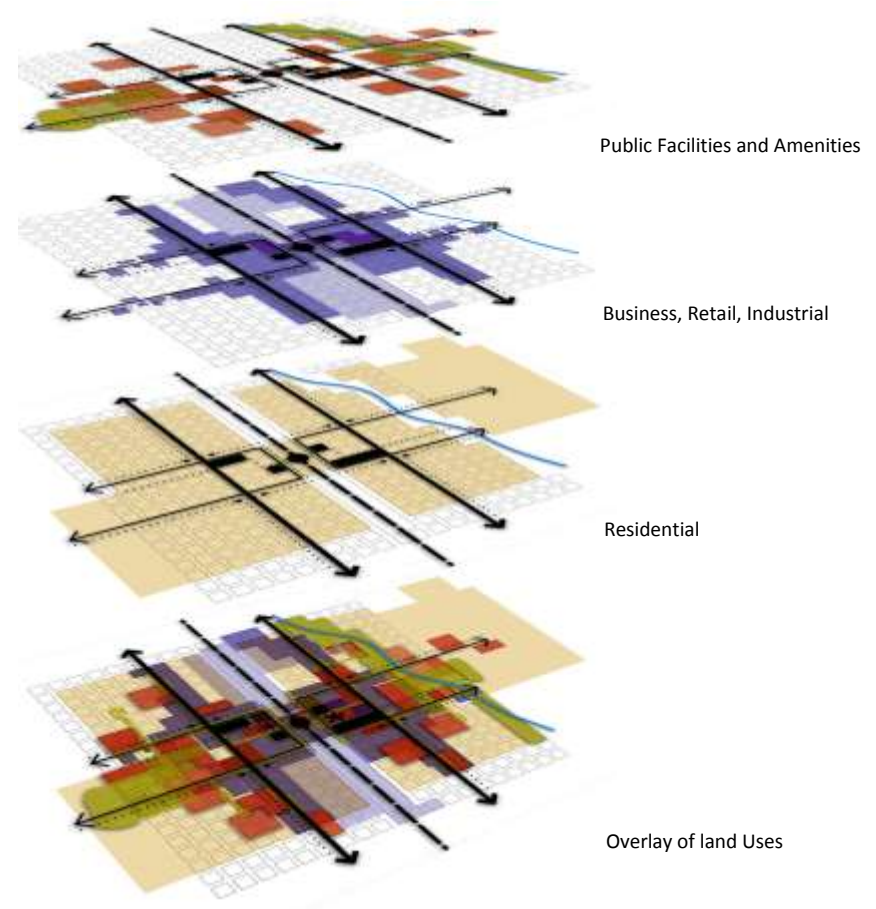


Figure 11: The land use layers which inform the Conceptual Land Use Framework

PART 4: CONCEPTUALISING THE FORM OF DEVELOPMENT

DELIVERABLE: SUB PRECINCT PLANS

OBJECTIVES:

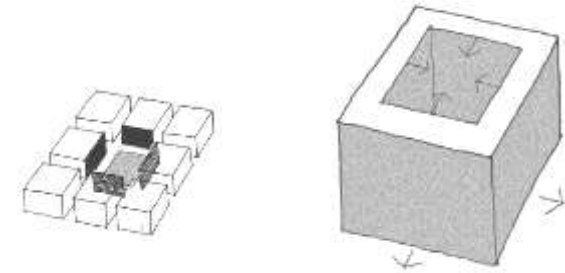
- To prepare plans for smaller parts of the Hub that identify how the urban blocks, streets and public spaces will be laid out and shaped in 3 dimensions at a conceptual level indicating proposed bulk / GLA where appropriate, land use and how the parking is to be addressed.

Part 4 provides guidelines for the professional team to move forward with design at a more detailed scale. It focuses on the form of the urban blocks and how best to achieve an **integrated mix of land uses that create a more vibrant and efficient urban environment**. It is at this point that the scale of the streets and public spaces, as the containers of urban life, are fixed. The width and the height of the development blocks defining the edges of the streets and spaces must be considered against the objectives expanded on below.

KEY URBAN OBJECTIVES

The following provides a brief explanation of six key urban objectives. Annexure D suggests how one goes about ensuring that these are met in conjunction with this section.

Definition

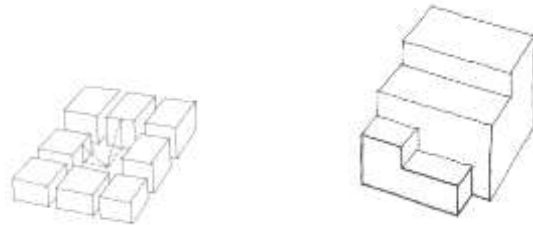


It is important to provide definition to public outdoor spaces. Enclosure created by buildings (or tree planting) provides psychological comfort. Built edges can also offer protection from dominant winds if the spaces are correctly orientated. However, the height of the buildings in relation to the adjacent space is a critical consideration.



Insert 6: Defined space vs expansive space

Scale



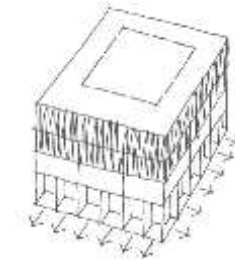
Scale is about the relationships between, in this case, humans and the built environment. While being a quality that cannot be easily defined it is something that is critical to the psychological well-being of an individual. Design associated with the public realm should always use the person on foot as a measure of appropriateness.

The width of the street spaces and the extent and shape of the public squares, forecourts etc. should be carefully considered against the volume of people expected to occupy the space and the nature of the expected activity. The over scaled nature of spaces and buildings can be mitigated through design and / or the utilisation of trees or other vertical elements.



Insert 7: Trees mitigating scale of public square vs empty, over scaled ground plain

Diversity



Buildings facing onto public streets and in particular the main PT routes and public spaces should accommodate a range of occupants. Large operators typically require visible entrances but prefer blank edges for security and / or privacy. Large tenants can therefore locate internal to development blocks or above ground, freeing the ground level and edge of the urban blocks for a range of smaller scale operators.

A vertical mix is also essential to ensure extended periods of activity into the evenings across areas that will contain some residential units.



Insert 8: Vertical and horizontal mix of land uses vs mono-functional/Land Use block development

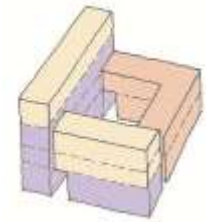
Adaptability



Positive settlements have always showed a measure of resilience and adaptability in their form and layout to accommodate changes in use and occupants over time. This is important not only to save on resources and minimise waste but to accommodate a range of agents and unexpected demands over time.

Places need to be adaptable at all scales. Households place different demands on their housing units through the decades and at the same time, towns and cities need to adapt to changes demanded through the global and local market. This requires buildings and infrastructure to be relatively adaptable to survive.

Compaction and Integration



The intensity of land use activities and density of buildings is essential to creating a vibrant urban environment.

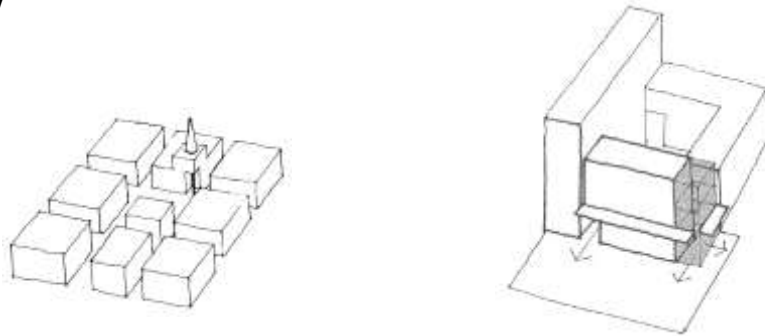
Where land uses are separated and developed in discreet pockets on their own land portions, the intensity of use of the total environment is diluted. Compaction requires that land uses are integrated horizontally and vertically.

The integration of different user groups is also critical to ensure vibrancy. Two of the main sets of user groups are pedestrians and vehicle owners. The potential conflict between these two user groups can be managed by prioritising one or the other clearly through design interventions. In the case of the Hub, pedestrians will generally be prioritised above private vehicles and their owners.



Insert 9: Isolated facility vs an integrated facility

Legibility



Development of the blocks needs to be legible to users in environments which are dense and integrated. Entrances need to be located in high visibility locations such as corners or associated to key open spaces. Where they are not they should be designed as welcoming spaces that people can clearly understand as the main access points to their intended destinations.

Furthermore design of the volumes of the intended development should give clues as to how the land uses / tenants / occupants / activities are distributed and relate to each other.



Insert 10: Legible form and layout vs non-legible form and layout

ACCOMMODATING A MIX OF LAND USES IN CLOSE PROXIMITY

The interface between land uses is particularly important when designing to reduce conflict within highly intense and mixed use environments. The following therefore must be considered for each of the respective land use developments:

- Privacy requirements
- Security requirements
- Access requirements (loading and unloading, emergency services)
- Servicing requirements
- Natural light and ventilation requirements
- Health and Safety requirements

This section focuses on how the urban block can be conceptually managed spatially to accommodate a mix of land uses in the **horizontal plain** across the Hub and within the urban block itself taking into account some of the requirements listed above.

Note:

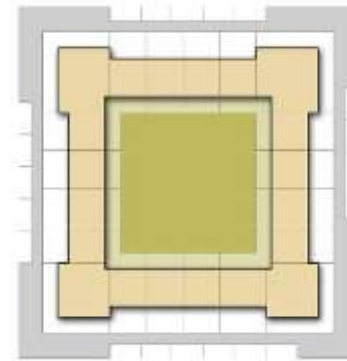
It should be noted that the same considerations will apply to a scenario where land uses are mixed vertically however the primary informant for mixing land uses vertically will be to optimise the public interface for the purpose of enlivening and increasing passive levels of surveillance over the street spaces. This is expanded on in Chapter 5.

RESIDENTIAL BLOCKS

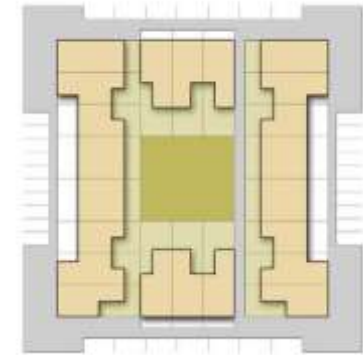
Residential development can be of two primary types when making more dense urban environments. It will either be in the form of perimeter type development around the edge of an urban block where living units are stacked on top of each other (Type A) or units that are built as continuous rows on small plots (Type B). The latter does not preclude stacked units but it generally doesn't allow more than about two to three storeys of units in total. The perimeter type block arrangement can therefore accommodate much higher densities.

Regardless of the type of units and arrangement there are certain guidelines that need to be used to ensure residential development can exist comfortably within an intense mixed use environment. They are as follows:

- Create semi private shared space for residents internal to the block where possible.
- Provide sufficient space at the interface (back and front) to achieve the desired privacy gradient
- Locate pedestrian entrances at points of high visibility / connectivity
- Locate parking in small planted courtyards within the block or between blocks and in limited lengths along the street.
- Where courtyards are created internally, make sure the building height to courtyard area is the right ratio to allow adequate levels of sun and light in. Conversely make sure the courtyards are sufficiently defined to create a sense of enclosure.
- Where courtyards are created, use the building as the security line to avoid requiring high fences /walls.



Type A



Type B

Figure 12: Typical Residential Blocks

COMMERCIAL / INSTITUTIONAL BLOCKS

Commercial / Institutional development can be configured in three ways:

1. An anchor tenant is located centrally within the block and the periphery is made available for smaller scale operators (Type A1);
2. An anchor tenant is located centrally within the block and the layout allows for pedestrian passage through the interior of the block. In this case it is necessary to edge the circulation space with small scale operators (Type A2); and
3. An anchor is located on the periphery of the block and with other smaller scale operators around the remainder of the periphery, defines an internal courtyard space that can be used either for parking, servicing or for a leisure / recreational space (Type B).

Regardless of the scenarios, the following guidelines should inform design of commercial / institutional ground floors:

- Where there is a range of different size operators/tenants, allow the smaller operators to locate on the most exposed street edges and along internal pedestrian routes to maximise on visibility and accessibility.
- Allow a finer scale penetration of blocks by pedestrians
- Limit the extent of the service interface for large tenants on the street
- Limit the amount of at grade parking, locating it rather below ground, or in limited lengths along the street edge.
- Align main pedestrian entrances with corners or other highly visible or accessible points on the periphery of the block.
- Integrate PT stops where possible into the edge of the building where the blocks edge important PT routes.
- Where courtyards are created internally, make sure the building height to courtyard area is the right ratio to allow adequate levels of sun and light in. Conversely make sure the courtyards are sufficiently defined to create a sense of enclosure.
- Where courtyards are created, use the building as the security line to avoid requiring high fences /walls.

- Where spaces on ground floor have two public interfaces consider how servicing of the units can happen without compromising the quality of the courtyard and street.

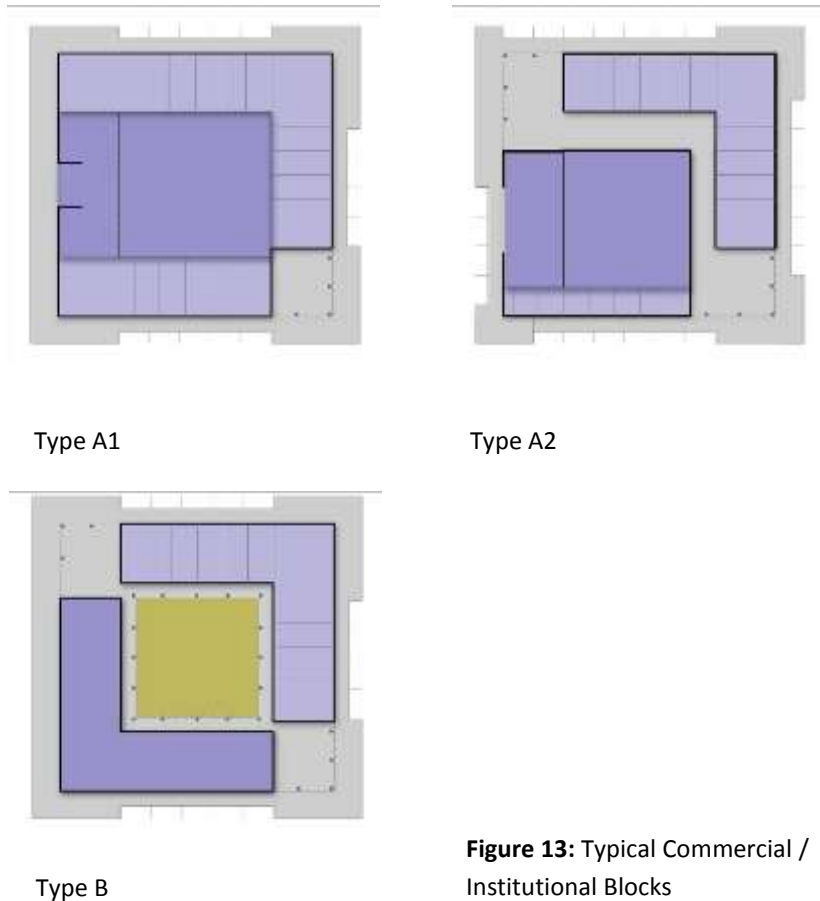


Figure 13: Typical Commercial / Institutional Blocks

MIXED USE BLOCKS

There will be a number of different ways to configure a mix of residential and more public/commercial land uses at ground level. This scenario presents the same challenges as those discussed above, however, the interface between the residential and other land uses, needs to be managed more closely.

When considering a horizontal mix of uses at ground level the following should inform design.

- The interface condition between the different land uses should be carefully negotiated especially with regards to servicing and access requirements.
- Where courtyards are created internally, make sure the building height to courtyard area is the right ratio to allow adequate levels of sun and light in. Conversely make sure the courtyards are sufficiently defined to create a sense of enclosure.
- Where courtyards are created, use the building as the security line to avoid requiring high fences /walls between the respective land uses/ developments within the block.
- The nature and location of the service entrances especially where there is the potential to make a positive people friendly inner courtyard.

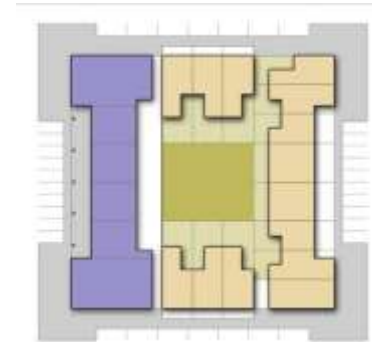


Figure 14: Typical Mixed Use Block

PART 5: MAKING THE PUBLIC REALM

DELIVERABLE: DETAILED DESIGN GUIDELINES AND URBAN DESIGN FRAMEWORKS FOR SUB-PRECINCTS

OBJECTIVES:

- To prepare Urban Design frameworks for each of the respective sub-precincts including layouts and typical interface conditions that demonstrate what the expectations are of developers / public sector occupants
- To prepare a set of design guidelines for the Urban Hub comprising a set of soft and hard landscaping details and specifications where necessary.

It has been shown that good design employed in the public realm addresses the liveability and the quality of an environment which translates into both economic returns and increased public value. Appropriately designed public interfaces, which define the public spaces and streets can make or break the success of the area as a safe but vibrant living and working environment. This section focuses on how considered design of the ground level and key public interfaces can improve the performance of the Hub.

The first part of the Part 5 focuses specifically on the interfaces defining key spaces and streets especially those edging the Prioritised Pedestrian Network. It should guide the designer in preparing interface guidelines and layouts for each of the sub precincts defined in the previous phase of work.

PUBLIC INTERFACES: DESIGN OBJECTIVES

The public realm is comprised of a set of public spaces and routes that form a connected whole and facilitate seamless movement between key destinations and places within a settlement.

The activities contained within the built edges that define the public realm and the form of the interface, are important when considering urban performance. It is for this reason that the following focusses on both land use aspects and formal aspects of design associated with the public interface.

Transparency

Eye contact and the ability for occupants of the internal spaces and passers-by to engage is critical – increased levels of visual connection make for healthier social relations, safer environments as people look out for each other. Ground floors in particular should be transparent / open on the public interface to facilitate engagement and increased levels of surveillance. Upper floors should have balconies and large apertures to increase eyes on the street.



Insert 11: Glass shop fronts and open mesh fronts offering opportunities for shop occupants to provide eyes on the street.

Detail

The façade must have sufficient detail to engage someone passing on foot. Too often facades are articulated and detailed for those passing in vehicles at speed. Facades designed for people in vehicles use large statement type forms or graphics to attract attention, which fail to provide interest to someone passing on foot at walking pace.



Insert 12: Façade designs and rhythm providing interest to passers-by.

Depth and modulation

Un-modulated ground floor facades, whether transparent or not, are alienating. They do not provide a level of psychological comfort necessary to encourage stopping or pausing. The flat smooth facades result in faster moving foot traffic thus resulting in less interaction between street users.

Facades with depth can ensure that the needs of the private individual/occupant of the building and the general public can be mediated. Balconies, terraces, arcades etc. create a transitional space in which the occupants of buildings and passers-by can engage.

Smooth facades also do nothing to retard air flows and can contribute to increased wind tunnel effects along the road network.



Insert 13: Modulation of facades providing depth, shade and interest

Climatic Responsiveness

It is vital that streets and public spaces can meet the basic comfort requirements of people by providing some measure of protection from the sun, rain and the dominant winds. Colonnades offer partial protection from the rain and sun which is important in the South African context.

Covered areas for small scale commercial operators should be provided where possible. Colonnades and covered streets can offer more vulnerable economic operators a more stable annual income by providing protection from inclement weather.

It is also important to respond appropriately to orientation. North facing facades are optimal for living areas, outdoor entertainment, restaurants, cafes etc. West facing facades need extra shading. South facing facades are ideal for working spaces as the south provides more even light through the day.



Insert 14: Covered trading areas and walkways offer shelter from the elements for pedestrians and street vendors

APPLYING THE PRINCIPLES

The following diagrammatic sections illustrate how one should use the principles and objectives identified above to inform the design of some of the key public interfaces.

The diagrams remind us of the importance of the privacy gradient and the value in the space between the internal volumes and the street kerb.

The Privacy gradient

In intensely urban environments where the street spaces are full of people and activity it is important to ensure that residents can be afforded some level of privacy and quietness. In The Heart residential development will be located above ground to create the space on ground level for more public activities. Outside of the Heart there may be instances where residential units will be located at ground floor level and it is these units in particular that need to be set back with low level landscaping, pergolas etc. that limit the extent of their visibility from the street. At the same time one does not want to limit the visual connection all together as eyes on the street are needed.

Transitional Spaces

The zone between the building and the road kerb has an important role to play in activating the street domain. In The Heart and along the Activity Corridors it should be used to accommodate controlled street vending, restaurants, cafes, PT infrastructure, and informal social activities. It must be an important focus area of the urban design guidelines and layouts as it is the logical place for landscaping.

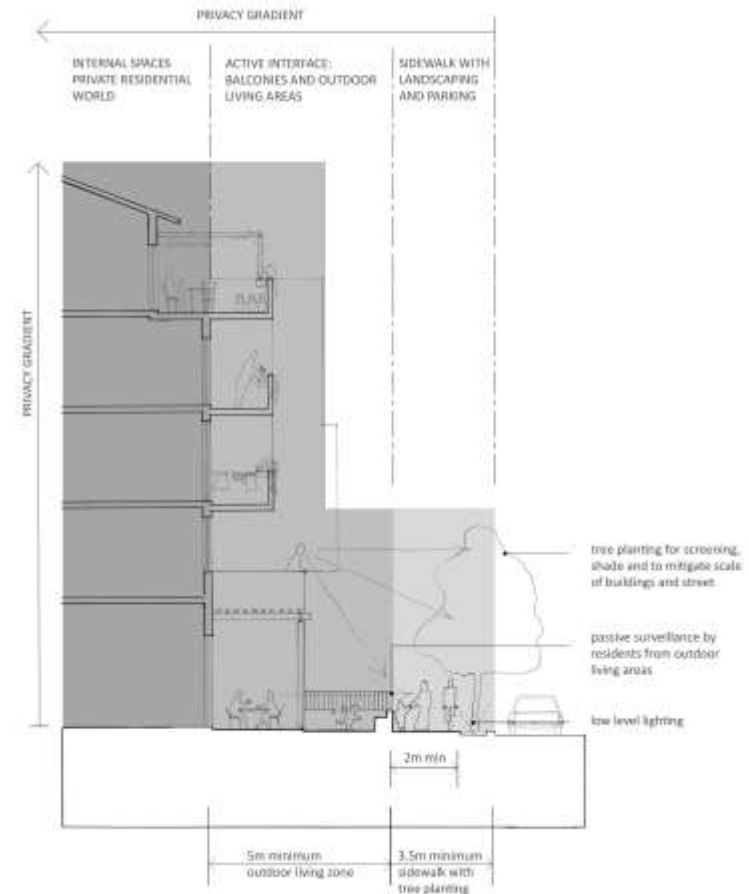


Figure 15: Residential Edge: A preferred spatial condition

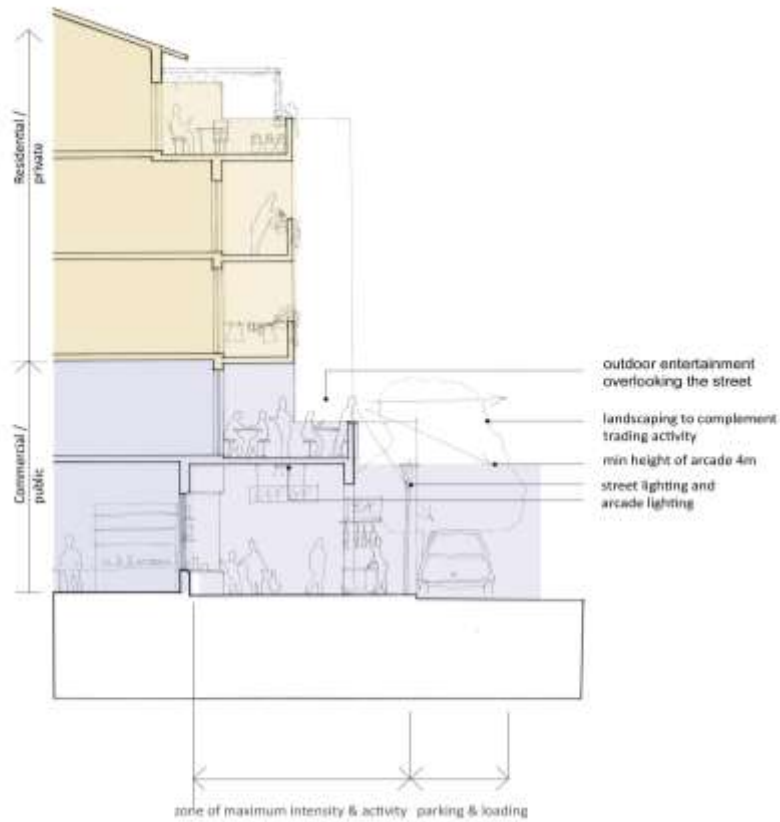


Figure 16A: Mixed Use Edge: Land Use and activity zones



Figure 16B: Mixed Use Edge: A preferred spatial condition

LANDSCAPING AND PLACE MAKING

The design guidelines to accompany the Urban Design layouts and interface guidelines, are expected to focus on landscaping as a tool to shape and give meaning to the public realm.

Guidelines related to the soft landscape elements may be comprised of planting lists and irrigation specifications etc. Guidelines related to the hard landscape elements may be comprised of paving specifications, typical paving details, signage, seating, and lighting details amongst other items. Where there is significant demand, a request for purpose designed items for the Hub can be proposed. The guidelines will then provide the necessary details to guide the manufacture of these items.

Built infrastructure such as the toilets, security kiosks etc. are also important potential space making tools and should be included as part of a 'kit' of landscape elements to address legibility, safety and use-ability of the public realm.

The following section provides guidelines at the level of principle to inform the compilation of specific landscape guidelines for the Hub.

Note:

Where landscape guidelines exist for the municipal or district area, they should be used as a starting point but reviewed and assessed for their applicability. Additional landscape guidelines should be developed where existing ones do not allow the NDP's key urban objectives to be met or where a unique new design language for the Hub is preferred. The landscape design guidelines must guide the public sector in setting up agreements with the private developers who will share in the responsibilities of implementing and maintaining the public realm.



Insert 15: Soft and Hard Landscaping contributing to increased levels of safety, comfort and enjoyment

SOFT LANDSCAPING

Tree planting

Trees can be used to address scale. Trees provide a sense of texture, and seasonal interest. Trees serve a dual purpose of ameliorating climate and defining space.

- Plant at maximum 5m centres and a minimum of 2m away from vertical faces, but this is also dependent on size of adult tree.
- Continuous lines of the same tree species provide strong edge definition.
- The introduction of different species should only be done when there is a need to mark key entrances, significant axis etc.
- Ensure tree planting does not obstruct main NMT routes or sidewalks.
- Trees should be conceptualised as groups/blocks or lines, where feature trees are used they should be reinforced with seating opportunities.
- Trees should be indigenous to Southern Africa.
- Trees should be planted as big as possible to enable the full impact to be understood up front by users of the spaces.
- Deciduous trees are appropriate within NMT zones but trees required to providing shade throughout the year should be evergreen.
- Try to locate trees close to seating so that people can site in the shade.
- Trees should be surrounded by tree cages where necessary through their first years of development to ensure protection from animals, vandalism and / or wind. Tree cages can be temporary and / or permanent although they all need to be robust, easily replaceable and easily maintainable. Tree cages should be designed to reflect the character of the surrounds. They can be simple and rough but they can also be more sophisticated if they are to be more permanent in nature.

Grass

Grass can offer visual relief but can also facilitate storm water infiltration

- Only use grass in less trafficked zones.
- Only use grass when the maintenance of these areas can easily be achieved, inclusive of watering, mowing and fertilising.
- Consider using grass blocks where traffic volumes are not great and where storm-water penetration is preferable.

Low planting

Planting provides visual relief and interest in hard landscaped areas.

- Create flower beds when the maintenance of these areas can easily be achieved, inclusive of watering, annual thinning, fertilising and replanting.
- Use indigenous water-wise palette of plant material.
- Where possible integrate seating and planting – planter box edges to be widened as seats for example.

HARD LANDSCAPING

Paving

Paving provides a means to define space, clarify zones and add to the identity of a space / link. Most importantly it improves the trafficability of surfaces. It can also provide a means to code space contributing to the legibility of the system of public spaces / routes.

- All hardened surfaces are to drain. A 2% fall is sufficient for a surface to drain.
- Make sure pavers are held with an edging and where large areas are brick paved that they are arranged in a herringbone or interlocking pattern to prevent shifting due to heavy use.
- In situ finishes should have expansion joints.
- Brick banding and expansion joints should be used to break up the larger areas of paving and allow the ground plane to be referenced back to an overall grid alignment or the buildings.
- Be careful to create large areas of light coloured surface as it will create glare. Large areas of dark finishes can contribute to a significant build-up of heat.
- Be careful to specify the correct strength pavers for those surfaces intended to be used by vehicles.
- Sidewalks / pedestrian routes should be a minimum of $\pm 1.8\text{m}$ to allow three people to walk alongside or pass each other and two wheelchairs / prams to pass each other. Minimum dimensions: Cycle Lanes should be a minimum of $\pm 1.5\text{m}$. When two-way cycling traffic is being catered for a minimum of $\pm 2.5\text{m}$ - 3m is recommended with 0.5m clearance on either side.

Bins

Bins must be located within areas generating litter e.g. in public squares around interchange facilities, areas where people will spend their work breaks, Bins should also be located in trading areas although this requires very frequent emptying and cleaning through a sustainable waste management strategy.

- Bins can be integrated with other elements such as seating or lighting to contribute to increased levels of legibility.
- Bins in the higher order public spaces located adjacent to key public facilities should accommodate recycling.

Lighting

Lighting serves an important function in making secure and safe public spaces. Light itself at night and the elements during the day as a series of vertical elements also play an important role in defining space

- Lighting can be used to focus flows by identifying key routes and must be used to light changes of level at night.
- Lighting can be used to create atmosphere and illuminate features whether they are built elements, features such as trees, art etc.
- Lighting can be integrated into bollards and buildings.
- Remember that reflected light is more effective than a direct light source.
- Lamp posts should be no more than approximately 15-20m apart however the light bulb will need to be specified to achieve this.

Signage

There are various types of signage including informative, communicative and directional signage.

- It is important that there is a consistent signage theme used throughout the public space network.
- Signage must not obstruct NMT users. It must be positioned outside of the main flow areas and not be lower than 2.1m if it is within an NMT zone.
- Signage for the visually impaired to be incorporated into broader signage strategy.
- Signage strategy to include temporary signage for events (e.g. Flags etc.).
- Signage should be compliant with all statutory regulations.

Seating

Seating provides opportunities for those on their feet to rest, pause, interact but they can also help to define space.

- Seats must be configured in relation to each other to encourage chance interactions but also to allow individuals opportunities to observe from a distance.
- Recommended seating width is 0.42m and seating height is 0.45m.

Bollards

Bollards along road edges can serve as warning barriers and to demarcate separate use zones. They can be used as a substitute for kerbs or in conjunction with them to indicate in particular the limits to vehicular traffic. They can also simultaneously be used as temporary seating elements.

- Recommended spacing is a minimum of 1.5m
- Recommended height is minimum of 0.9m and maximum of 1.2m

Bike Racks

Bike racks should be provided at all main public entrances off the main streets. For the bikes to be secure the bike racks need to be located in view of passing pedestrians that is steady through a 16 hour day or within a securitised precinct.

- Bike racks must be positioned so that they do not obstruct pedestrian flows.
- Bike racks must consist of a non-removable frame to which a bicycle can be secured without falling over.

Art and sculpture

Art and sculpture within public spaces can provide a means for culture to be expressed. It ensures art is accessible to wide range of people. Sculpture can add to the identity of a space or place. Art and sculpture can be used to create interest and instigate engagement between people who don't necessarily know each other. Art can also help to focus attention to a particular point within a

space or be used to direct movement and or views, in a particular direction. Sculpture can activate spaces by encouraging levels of physical engagement of individuals using public spaces.

- Local artists should be used where possible.

Toilets / water points

Provide toilets at key points including but not limited to transport interchanges and public spaces, market spaces. These should preferably be integrated into the buildings in the vicinity and managed to ensure accessibility through extended hours including early mornings and late evenings.

These service points can also be standalone elements and if so should be iconic landmarks and space making elements. They can be combined with other information sharing functions to create mini-one stop shops.

PART 6: CONSIDERING AN APPROPRIATE IMPLEMENTATION PHASING STRATEGY

DELIVERABLE: PHASING PLAN AND STRATEGY

OBJECTIVE:

- To consider an implementation phasing strategy.

THE ROLE OF THE MUNICIPALITY

The NDP's intentions are to use public funding to leverage private sector investment. If the constitutional mandate of the municipality is to be developmental and pro-poor, it must take a strong lead and make the objectives clear upfront to the private sector who will ultimately be benefitting in the long term indirectly by a broadening market.

In a fickle economy Local Municipalities will have to play an even stronger and more proactive role as the private sector will be more resistant to investing in areas perceived to be more risky and will want to set more stringent conditions. Here in lies the biggest challenge.

To ensure that one does not allow a business as usual development scenario to play itself out with little consideration of what is required to create a more urban and qualitative environment, the Municipality will need to be very clear in their strategy and method of engagement about the expectations of the State who should act in the interest of the broader public.

For this reason the toolkit puts forward a number of principles that the phasing plan should be informed by. They are as follows:

- The phasing plan must demonstrate commitment to the private sector that the public sector is on board
- The phasing Plan must fix non-negotiable elements through construction of new or upgrade of existing PT facilities and access routes.
- The phasing Plan must focus on connecting the Hub to the metro network AND local access network simultaneously as far as possible to ensure integration of the new development. In other words where rail stations are upgraded, NMT linkages between the stations and the local areas should be implemented simultaneously.
- The phasing Plan must ensure all NMT routes are framed by development from the start. The edges can be phased themselves if they are conceptualised as colonnades that get filled in over time.
- The first phases of development should always attempt to create a 'complete system,' i.e. a network that connects key generators of movement and destinations.

SPATIAL PHASING STRATEGIES

Approaches to phasing cannot be considered without understanding the potential institutional arrangements that will need to be put in place between the respective role players and the land release strategy that the State prefers to adopt. Furthermore the approaches will also be informed by land ownership patterns and income streams required by the local municipality to sustain their involvement in the development of the hub and the surrounding area.

The following puts forward an ideal spatial phasing approach informed by the principles listed above. It uses the Access and Movement Framework and Conceptual Land Use framework as a starting point. This ensures that key elements of the proposed urban structure are fixed from an early stage and form a robust and legible framework onto which future development can clip in time.

Step 1:

- 1 Focus public funding on the construction or upgrade of rail infrastructure and / or higher order road based infrastructure (such as a BRT) linking the Hub to the broader metro area followed by other PT facilities within the proposed Interchange Zone that will connect the main PT service to a local road based service. Ensure that the pedestrian linkage between the rail and the road based PT service facility is established and is framed by an active interface. Should developers from the private sector be scarce, the public sector must consider creating an interface themselves. This provides an opportunity to answer to the needs of small scale commercial operators while allowing for an optimal spatial condition to be set up.

Note: It is preferable to get the private sector on board at this stage to invest in development of the PT facilities to ensure integration of commercial land uses.

Step 2:

Focus public funding on the construction of minimal road linkages to connect hub with fine scaled local road network and new public facilities that can help to create a sense of place. Simultaneously construct remaining PT facilities required to create integrated system of services.

Step 3:

Incentivise private sector to invest in integrated mixed use developments **within the Interchange Zone** and future Heart of the Hub, ensuring delivery of a mix of commercial, public / institutional and residential land uses. The public sector should focus on delivery of regional or district scale facilities/amenities and key spaces and / or social facilities that would encourage the private sector to invest in specific locations within the Heart.

Step 4:

Focus public funds on the extension of the Hub access network with a focus on components of the prioritised public spatial network, and service land ready for more private sector development. Continue to invest in spaces and or social facilities that would encourage the private sector to invest in specific locations along the secondary and local connectors.

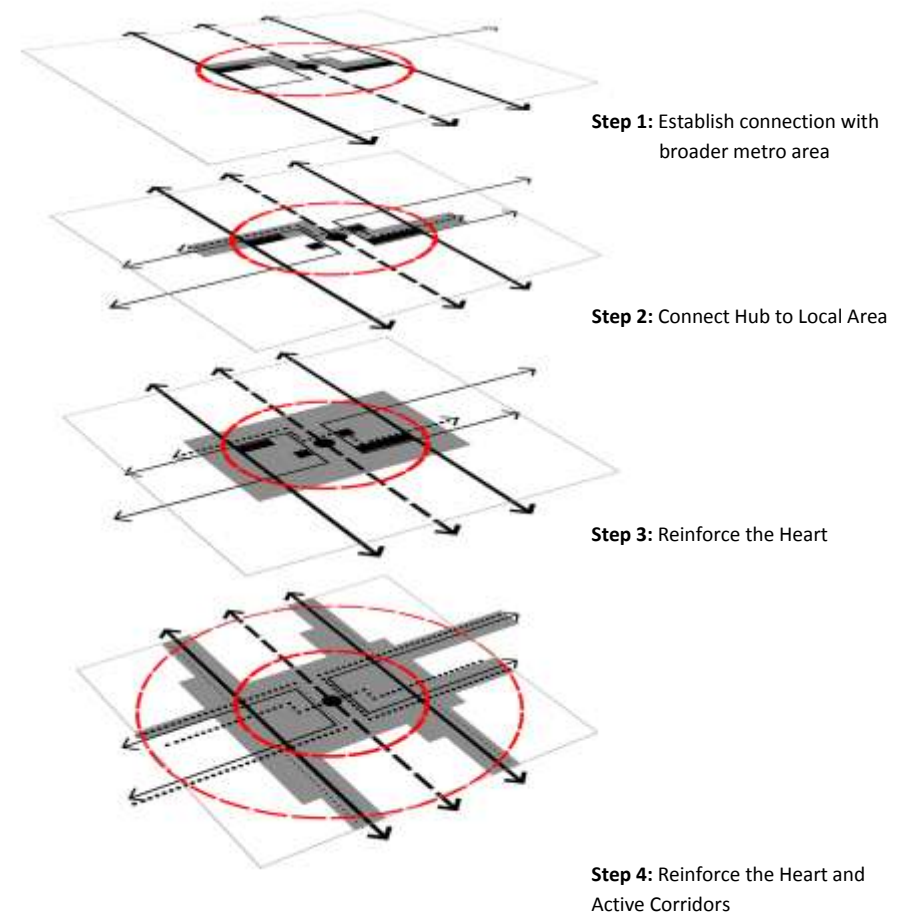


Figure 17: Generic phasing strategy that reinforces PT as the key structuring element

While the overarching intention of the NDP is to change the way out cities are structured, some phases of the roll out of the Hubs may have other specific objectives including the following:

- Demonstrating the state's commitment to capital expenditure;
- Demonstrating the state's commitment to sustainable management solutions; and
- Demonstrating the sustainability of alternative development models and forms.

Irrespective of the phasing / implementation strategy, the municipality must take a proactive pro-poor approach to urban land governance and facilitate integrated solutions that will require different departments within the municipality and spheres of government to work together. In this regard it is critical that all departments, individuals and spheres share a common set of objectives and set reasonable and strategic time frames.

PART 7: THE EVALUATION CRITERIA

The following checklist will help the Project Manager evaluate whether the proposals meet with the key expectations of the NDP. The checklist will also be of use to the professionals as they progress through the respective tasks to see whether the key design objectives are being met.

The checklist has been broken up in accordance with a set of potential deliverables. Note the checklist does not cover all the material expected to be delivered through this process but will rather focus on the plans (networks, frameworks, layouts etc). For example it does help to evaluate specific infrastructure proposals related to each of the PT and NMT facilities contained within the Access and Movement Framework. It will help to evaluate the network in so far as it locates and scales the infrastructure components.

STATUS QUO REPORT		
	Checklist	Yes or No
1.	Are the environmental, social and economic needs identified?	
2.	Is there a spatial synthesis that identifies and maps the major opportunities and constraints?	
3.	Is there a provisional understanding of the extent of the hub to be the subject of this exercise (greenfields and brownfields)?	
4.	Is there a description of the character of the node now and into the future?	
5.	Is there an understanding of the land use planning, policy and land ownership constraints?	

ACCESS AND MOVEMENT FRAMEWORK REPORT		
	Checklist	Yes or No
1.	Does the road network respond to the topography appropriately?	
2.	Are the urban blocks proportioned so as to allow a set of transport services to operate efficiently as one integrated system?	
3.	Can people find / orientate themselves easily by referencing off topographical features and a hierarchical logic in the network?	
4.	Has the proposed network addressed the challenges presented by major linear forms of infrastructure (rail lines) and / or topographical features (rivers) which prevent seamless connections for those on foot?	
5.	Does the network locate the main bus, taxi and rail/BRT facilities within walkable distance from each other?	
6.	Does the network provide for a set of continuous local road and NMT connections between the Interchange Zone and the Hub surrounds?	
7.	Do the strategies supporting the framework address the scale of the roads to allow for the correct balance of pedestrian to vehicular needs to be met in strategic locations and zones?	
8.	Does the framework adhere to current and proposed local transport policy and proposals and if not are the implications for the planning process understood?	

CONCEPTUAL LAND USE FRAMEWORK		
	Checklist	Yes or No
1.	Can the most accessible and visible locations accommodate street vending?	
2.	Does the layout allow large commercial anchor tenants to be located strategically in support of smaller scale operators including street vendors?	
3.	Does the layout allow commercial activity to agglomerate in relation to activity routes and the Interchange Zone?	
4.	Is there a mix of land uses to extend hours of activity (beyond standard work day hours) at strategic points in the hub such as within the Interchange Zone and Activity Corridors?	
5.	Are SAPS facilities located so as to be visible and accessible to main commuter flows?	
6.	Do the routes within the Prioritised Pedestrian Network link key public destinations?	
7.	Are the public institutions, facilities, amenities and services clustered where possible?	
8.	Are land uses such as manufacturing located to ensure residents are not exposed to harmful noise levels, fumes etc.	
9.	Are the green open spaces located in relation to the topography in such a way as to help storm water management?	
10.	Does the layout allow significant historical and cultural linkages to be maintained and strengthened? The Public Space Network should reinforce the critical linkages.	
11.	Does the land use budget consider the needs of the community?	
12.	Have the housing densities and typologies been informed by local housing needs?	
13.	Have the housing typologies included a range of types to accommodate changing needs over time?	
14.	Are the land uses proposed broadly compatible with each other and those outside of the Hub?	
15.	Does the framework adhere to current and proposed zoning and policy and if not has a land use planning process to seek additional development rights and or revise existing policy been highlighted?	

PRECINCT PLANS		
	Checklist	Yes or No
1.	Are pedestrians kept as far as possible at grade?	
2.	Are the main public spaces and routes clearly defined and distinctive?	
3.	Are there any dead zones at the scale of the whole? For example, are there any large expanses of vacant land, large 'un-activated' landscaped areas, public streets with no overlooking features or active interfaces that people are reliant on, on a daily basis to access home, work, shopping or play.	
4.	Are the key spaces and routes edged by appropriately scaled buildings?	
5.	Are the development envelopes scaled to allow fine grained pedestrian movement across the Hub?	
6.	Do the levels above ground along routes within the Prioritised Pedestrian Network accommodate the type of land use that could offer passive surveillance over the public domain?	
7.	Do the plans propose a range of activities at ground floor and above to activate those routes used by commuters in the early evening and morning hours?	
8.	Do the key social facilities /institutions have large public spaces/forecourts into which the public programmes can spill over and overlap?	
9.	Are street traders expose to highest thresholds in the Hub?	
10.	Does the Precinct layout allow for the clustering of potentially compatible facilities / services?	
11.	Does the Precinct Layout allow for the agglomeration of similar commercial / business type activities?	
12.	Are the spaces and streets scaled appropriately for those on foot?	

SUB PRECINCT PLANS		
	Checklist	Yes or No
1.	Are the pavements generous enough to accommodate the required pedestrian flows? Note: Pedestrian routes should have a clear width of a minimum of 2m.	
2.	Are the ground floor interfaces sufficiently detailed and appropriately scaled to encourage people to pause, linger and engage with what is on display?	
3.	Is there a common language of design within the main public spaces that comprise the Public Space Network?	
4.	Is there sufficient lighting within the Sub-Precinct and in particular the spaces and streets within the Prioritised Pedestrian Network?	
5.	Are the ground floor interfaces going to be sufficiently transparent and interactive to allow surveillance of the streets and public spaces within the Prioritised Pedestrian Network?	
6.	Does the architecture respond to the climatic conditions appropriately?	
7.	Do the levels above ground along the key public routes have overlooking features encouraging occupants to have their eyes on the street?	
8.	Where pedestrians are channelled through subways, are they generous, well lit and activated with commercial activities as well as universally accessible?	
9.	Where pedestrians are channelled over the rail line via bridges are they generous, well lit and activated with commercial activities as well as universally accessible?	
10.	Are the critical access routes to and between the various modes of transport universally accessible?	
11.	Are the public spaces and routes orientated optimally as far as possible and sufficiently enclosed to protect from dominant winds?	
12.	Are there opportunities for commuters to seek some level of refuge from the rain and sun when moving between the main PT interchanges and stops, stations?	
13.	Are there spaces within the Public Space Network that can accommodate special events that don't detrimentally affect flows?	
14.	Are roads that handle large volumes of parallel and perpendicular pedestrian movement designed to prioritise pedestrians?	

URBAN DESIGN LAYOUTS		
	Checklist	Yes or No
1.	Does tree planting create shade in well utilised public spaces and shade warmer building interfaces?	
2.	Is tree planting utilised in public parking areas to lessen the visual impact?	
3.	Is tree planting utilised in large hard surfaced areas to reduce heat build?	
4.	1. Are public bins located to allow for easy collection and recycling strategies to be implemented?	
5.	Are plant materials low maintenance and water wise?	
6.	Is planting grouped to facilitate easy irrigation arrangements?	
7.	Is irrigation designed to reduce excessive water evaporation?	
8.	Is street furniture placed so as not to restrict critical pedestrian flows?	
9.	Are the proposed landscaping materials robust enough that they require only limited and simple maintenance?	
10	Are street elements such as seating, refuse bins, lighting etc. designed for easy replicability?	
11.	Is seating and lighting positioned optimally to allow increased levels of engagement between people?	

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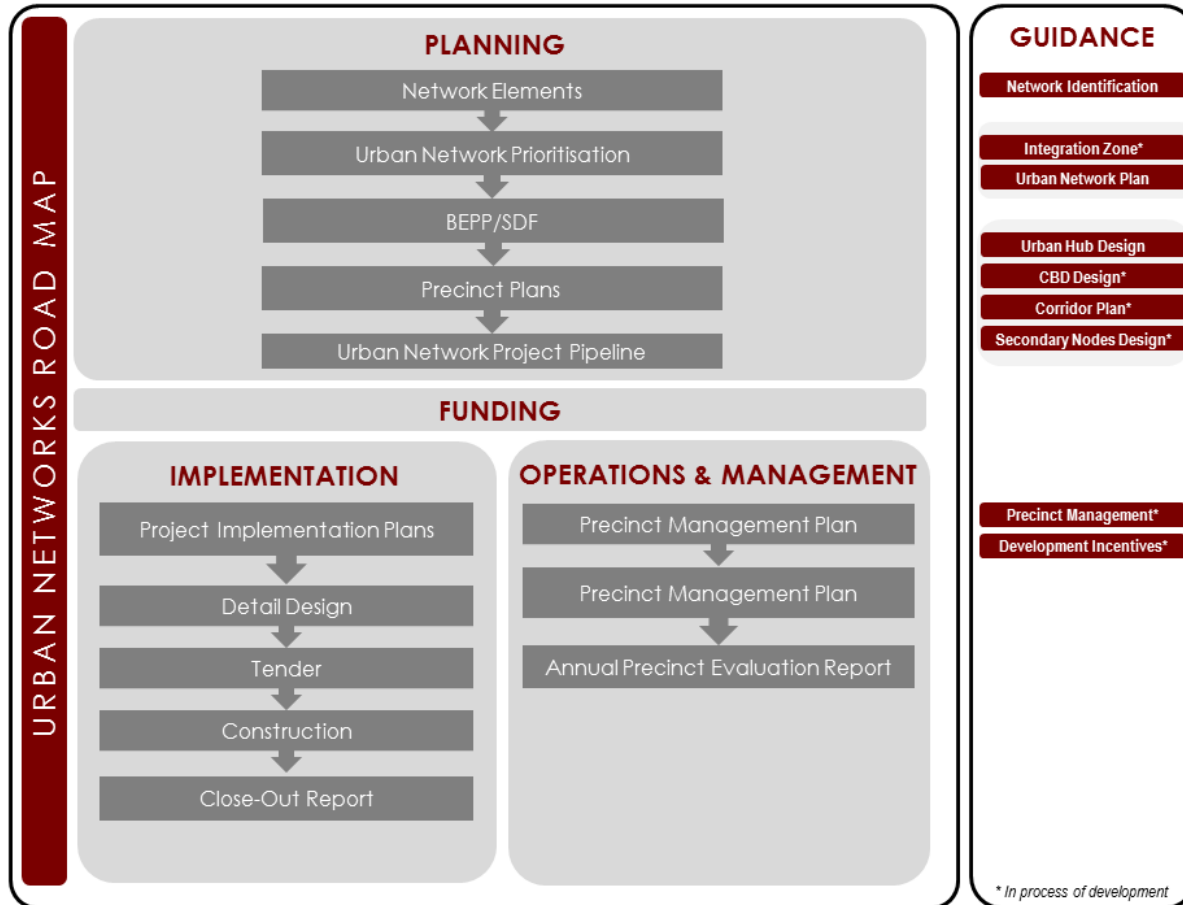
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ANNEXURE A: THE URBAN NETWORKS ROAD MAP (21 January 2014)



ANNEXURE B: TEMPLATE E: HUB – STATUS QUO ASSESSMENT SHEET

TEMPLATE E

URBAN HUB: STATUS QUO ASSESSMENT

Complete the following assessment sheet as the first step in working towards proposals for the Hub.

The area for analysis should include the area provisionally identified to comprise the Hub however the analysis itself may lead to the revision of the Hub boundary. The area should therefore be generous enough that it allows for a minor shift in the boundary.

Note: Mapping must be undertaken using an appropriate geo-mapping tool such as GIS or AutoCAD that allow layers of information to be over-layed. This is important as it allows patterns / relationships between land use, transport and infrastructure and topography to be observed.

GENERAL / PLANNING AND REGULATORY ENVIRONMENT			
NO	TASK	TYPICAL RESPONSE	MAPPED LAYERS
1.1	Show on a map Land Ownership in the vicinity and indicate whether there are any land tenure issues such as illegal occupation of land and / or land claims	E.g. Site X is illegally occupied by X many households and there are no land claims.	Land Ownership
1.2	Show on a map Zoning in the vicinity according to the relevant Zoning Scheme	E.g. Larger sites are being rezoned to accommodate flats.	Zoning
1.3	Note land use parameters / regulatory measures applicable to the sites in question.		
1.4	Map and describe the implications of any applicable Planning Policy (nodes, corridors)	E.g. The SDF identifies the intersection of X and Y roads as a node of regional significance. They propose mixed use development in the node. Recent development of Site X and Y have responded to this.	Planned Nodes and corridors

2.LAND USE PATTERNS			
NO	TASK	TYPICAL RESPONSE	MAPPED LAYERS
2.1	Describe and map the main land use patterns within the precinct. Distinguish as a minimum between commercial (including Industrial, business, offices, retail etc.), residential, Institutional, green open space used for recreational purposes, conservation areas and utilities. Where the Municipality has detailed information include this.	E.g. The area comprises mainly single residential houses with large tracks of vacant land.	Broad Land Use types
2.2	Describe the main development trends, initiatives in the vicinity.	E.g. Development of the precinct is to the east where some SHIs are planned.	
2.3	Describe the land use character of the precinct.	E.g. The precinct is the main economic hub of the township. A large shopping center is located on the eastern side of the precinct.	

3. ACCESS AND TRANSPORT			
NO	TASK	TYPICAL RESPONSE	MAPPED LAYERS
3.1	Identify and map existing PT services and stops		PT connectivity and discontinuity
3.2	Identify and map limitations for connection via PT modes with broader area		
3.3	Map pedestrian and cycling movement patterns and indicate graphically the level of intensity of each.		Pedestrian connectivity and discontinuity
3.4	Identify and map barriers to pedestrian movement at the local scale		
	Compile a report based on outcomes of walking audit when dealing with a brownfields site.	<i>e.g. Vermeulen Street: limited width of sidewalks. Road signage cluttering sidewalk. Street trading restricting pedestrian cross movement, lighting inadequate at night around station etc</i>	
3.5	Identify and map hierarchy of roads and list class of roads (existing and proposed)		Existing hierarchy of routes
3.6	Identify and map goods transportation lines (rail and road)		Goods movement lines
3.7	Confirm transport planning for the township focus area	<i>E.g. No rail extensions within the next 20 years planned. Major public intermodal transport facility currently under construction in Denneboom, Mamelodi.</i>	Transport Proposals

4. SOCIAL CONTEXT			
NO	TASK	TYPICAL RESPONSE	MAPPED LAYERS
4.1	Map and describe the nature and condition of facilities within the Hub <ul style="list-style-type: none"> • Pre –School • Primary School • Secondary School • Library • Clinic • Hospital • Multi-purpose / Community Centre • Sport Facility • Other 	<i>E.g. There are three Primary Schools but they are all in a bad condition with limited sporting facilities</i>	Existing institutions / facilities (location and extent)
4.2	Map the location of areas / sites perceived to be unsafe and describe nature of crime	<i>E.g. Crime is associated to the vacant land which residents cross to access the schools. It is mostly petty theft/ muggings</i>	Crime prone areas
4.3	Provide a rough breakdown of the split in housing tenure status (ownership, rental etc.)	<i>E.g. Ownership-5400, Rental-200</i>	
4.4	Describe housing typologies and densities	<i>E.g. The housing is generally of a suburban nature – free standing on plots of X^m with a net density of ?du/ha</i>	Areas of varying density / housing typology
4.5	Provide a breakdown of split between formal, informal and traditional dwelling types, backyard dwellings and hostels.	<i>E.g. Formal-520, Informal -360, Backyard Dwellings-25</i>	
4.6	Confirm the housing need within the precinct?	<i>E.g. 20 000 Units-Individual housing subsidy, 5000 Units-Bonded</i>	
4.7	Describe any particular social / health related problems within the localized community	<i>E.g. The informal settlement on Erf X has a high incidence of TB</i>	

5. ECONOMIC CONTEXT			
NO	TASK	TYPICAL RESPONSE	MAPPED LAYERS
5.1	Identify and map existing retail/business hubs		Existing business activity
5.2	Confirm and map any proposed/planned business opportunities within the node.		Planned commercial activity
5.3	Describe main economic trends within the broader area	<i>E.g. Industrial development in the area north of the hub and intense informal trading on the edge of this area</i>	
5.4	Investigate and map all street vending /service related activity. Show location and extent (approximate number of operators) of 'informal' activity.		Existing street trading

6. INFRASTRUCTURE			
NO	TASK	TYPICAL RESPONSE	MAPPED LAYERS
6.1	Confirm and map the location, capacity and condition of infrastructure and services to supply current needs and future development within the area: <ul style="list-style-type: none"> • Water Services • Sanitation • Electricity • Gas • Storm Water • Solid Waste Disposal 	<i>E.g. Solid Waste Disposal</i> <i>Entire area serviced weekly.</i> <i>Currently waste disposal facility has reached capacity- new site for disposal of waste is required.</i>	Infrastructure connections
6.2	Confirm and map any service related servitudes, right of way and setbacks	<i>E.g. The? kVA power line crossing Erf X is located within an Xm wide servitude and has a setback requirement of 25m.</i>	Servitudes, rights of ways etc

7. ENVIRONMENT (TOPOGRAPHICAL)			
NO	TASK	TYPICAL RESPONSE	MAPPED LAYERS
7.1	Describe and map the Geotechnical conditions and highlight implications for development	<i>E.g. Dolomite limits development on eastern side of node.</i>	Areas of geotechnical constraint
7.2	Identify topographical features and map them on contoured base		Key topographical features

8. ENVIRONMENT (BIO-PHYSICAL)			
NO	TASK	TYPICAL RESPONSE	MAPPED LAYERS
8.1	Map and describe environmentally sensitive areas such as wetlands or botanically significant sites	<i>E.g. The wetland is ecologically sensitive. The area to the south of it is of medium botanical significance which means that it cannot be developed and a setback may be required.</i>	Environmentally sensitive areas
8.2	Map and describe pollutant activities such as dumping, erosion of slimes dams, noise pollution etc.	<i>E.g. Dust pollution occurs due to mine dump located on the northern corner of the township focus area.</i>	No go areas for residential and other institutional developments.
8.3	Map existing parks, recreational areas, conservation areas		Open green areas of significance.

9. ENVIRONMENT (CULTURAL/HISTORICAL)			
No	TASK	TYPICAL RESPONSE	MAPPED LAYERS
9.1	Map and describe sites of historic significance to the community	<i>E.g. Bleskokspruit World Heritage Site comprising the floodplain and botanical resources</i>	Culturally and historically significant sites and connections
9.2	Map and describe sites of social significance for example sites that have been used to worship communally	<i>E.g. The grassed slope east of the river is used extensively by church groups on a Sunday</i>	
9.3	Map and describe sites of cultural significance	<i>E.g. The vacant land west of the towers is used for initiation rights</i>	

10. ENVIRONMENT (SPATIAL/COGNITIVE/MENTAL MAPPING)			
No	TASK	TYPICAL RESPONSE	MAPPED LAYERS
10.1	Map the landscape (built and inbuilt) as a set of edges, nodes, paths, landmarks, domains as per Lynch, 1960)		Landscape as set of landmarks, domains, edges, paths and nodes
10.2	Describe urban morphology – building types, typical materials and how types respond to topography, climate if relevant	<i>E.g. The houses have covered outdoor areas to allow for outdoor living OR E.g. Buildings are generally part constructed of stone as it is readily available</i>	

11. CLIMATE			
No	TASK	TYPICAL RESPONSE	MAPPED LAYERS
11.1	Note the dominant wind directions	<i>E.g. SE wind blows through summer months. NW wind through winter and carries rain.</i>	
11.2	Note average temperatures for summer and winter	<i>E.g. 22° average through summer, 15° average through winter</i>	

12. INSTITUTIONAL			
No	TASK	TYPICAL RESPONSE	MAPPED LAYERS
12.1	Describe payment for services.	<i>60% payment for services</i>	
12.2	Describe community involvement in urban management	<i>Community stakeholders involved in decision making</i>	

ANNEXURE C: LAND USE CHARACTER ZONES: GUIDELINES

LAND USE CHARACTER ZONES: GUIDELINES		
ZONE	CATEGORY	GUIDELINE
Heart		
	Land Use Proposals	Vertical arrangements to dominate: Ground floors should be active and public in nature 18hrs/day. First floor upwards should have overlooking features on the street edge. <ul style="list-style-type: none"> ○ Land uses will include: Hard public Space (for events, trading), Commercial, institutional, civic, government offices, health facilities, libraries, colleges, offices, transport related facilities, residential, clean high end manufacturing. Residential densities should be the highest in the node. Requiring multi-level development. ○ Residential densities will range between 100-375du/ha (net)
	Spatial Conditions	Highest bulk within hub is to be permitted here; and depending on context could be up to 15 floors although a max of 7 may be more realistic in the medium term. A minimum of 4 stories is required. A range of operators including large anchor tenants and smaller scale operators should be accommodated.
	Environmental Conditions	A common design language must be employed within the public network of streets and spaces. Public interfaces are crucial and should be designed according to a set of guidelines. Ground floor facades should be permeable and interactive. Levels above ground should have overlooking features to encourage passive surveillance over the street. Hard and soft landscaping should reinforce special places and busy pedestrian links.
	Structural Focus	Pedestrian / commuter movement routes and forecourts to higher order facilities.
Active Corridor Zones		
	Land Use Proposals	Vertical arrangements to dominate: Ground floor should be public / active in nature 16hrs/day. First floor upwards should have overlooking features on the street edge. <ul style="list-style-type: none"> ○ Land use types: Hard and soft public Space (for residents and employees), commercial, institutional e.g. libraries and schools, colleges, offices, transport related facilities, residential, clean, high end manufacturing. ○ Residential densities will range between 75 and 175du/ha (nett)
	Spatial Conditions	Bulk should be between 3 and 7 stories depending on context.
	Environmental Conditions	Public interfaces are crucial. Ground floor facades should be permeable and interactive. Levels above ground should have overlooking features to encourage passive surveillance over the street. Hard and soft landscaping should reinforce special places along the activity routes and within the broader corridor zone.

	Structural Focus	Pedestrian / commuter movement routes towards the corridors and the “Interchange Zone”
Transition Zones		
	Land Use Proposals	<p>Development will not be as high as other two zones. Ground floor related development should define street edge and should be public / active in nature 16hrs/day. First floor upwards should have overlooking features on the street edge.</p> <ul style="list-style-type: none"> ○ Land use types: Higher order green Open Spaces, limited commercial, institutional e.g. libraries and schools, residential, clean-high end manufacturing in appropriate locations, holding facilities for transport services, utilities. ○ Residential densities should be reasonably high if within 800m or so of the “Interchange Zone.” Residential densities will range between 50 and 175du/ha (nett)
	Spatial Conditions	Bulk should be between 2 and 7 stories depending on context. Residential densities to be accommodated in a range of high density typologies including townhouses. Other institutional and / or manufacturing activities should be accommodated within a minimum of 2 to 3 storey buildings.
	Environmental Conditions	Development should still attempt to make a positive street frontage. Levels above ground to have overlooking features to encourage passive surveillance over the street. Soft landscaping to reinforce special places that provide recreational opportunities for local residents. Planting of trees to be accommodated within all residential road reserves as a minimum. Large Open Spaces should be edged by multi-storey development.
	Structural Focus	Pedestrian / commuter movement routes towards the corridors and the “Interchange Zone.” Green Open Space system to be more extensive in this Zone and to connect to a prioritised pedestrian network.

ANNEXURE D: MAKING THE PUBLIC REALM: HOW TO MEET THE KEY URBAN OBJECTIVES

MAKING THE PUBLIC REALM: HOW TO MEET THE KEY URBAN OBJECTIVES	
Objective	
Definition	<ul style="list-style-type: none"> Ensure that the scale of the edges of the proposed urban space are sufficient to create a sense of enclosure – see diagram below (Moughton in CSIR, 2000) for guidance. <div style="text-align: center;"> <p>Full 1:1 Threshold 1:2 Minimum 1:3 Loss 1:4</p> </div> <ul style="list-style-type: none"> When designing at the level of the urban block, use the buildings to define the street, public spaces and internal courtyard areas. Use tree planting and / or vertical elements such as lighting posts, flag posts etc. to define spaces and achieve a sense of enclosure
Scale	<ul style="list-style-type: none"> Use level changes, lighting and or tree planting to break up large ground floor plains Allow blocks to set back above ground level to respond appropriately to scale of adjacent roads and spaces Scale urban blocks to allow comfortable pedestrian walking distances or alternatively allow pedestrians to traverse through urban development blocks
Diversity	<ul style="list-style-type: none"> Provide for a range of operators within an urban block with the smallest operators on ground floor where they are exposed to the passing pedestrians and the larger tenants/operators located above ground or internal to the blocks Ensure a diverse mix of land uses within any one precinct to extend hours of activity in strategic locations along the main pedestrian routes and around key public precincts Ensure a mix of uses that help to attract people to live, work and play in the same area
Adaptability	<ul style="list-style-type: none"> Encourage developments that provide flexibility in their layouts (depth and floor to ceiling heights) to accommodate a range of operators over time Promote adaptable housing unit layouts to accommodate range of occupants Encourage development that can accommodate temporary and permanent land uses Encourage designs to provide for more generous floor to ceiling heights at ground floor level.

MAKING THE PUBLIC REALM: HOW TO MEET THE KEY URBAN OBJECTIVES	
	<ul style="list-style-type: none"> • Design public spaces to accommodate a range of activities • Always consider how buildings can best be positioned on sites to accommodate growth over time keeping in mind that linear arrangements are easier to extend than centralised arrangements • Access and servicing layouts must be designed to take account of foreseeable changes in demand • Public rights of way should be kept free of management agreements which restrict changes in the interests of the public
Compaction and Integration	<ul style="list-style-type: none"> • Mix compatible land uses within urban blocks both vertically and horizontally • When mixing land uses <ul style="list-style-type: none"> ○ structure the precincts/blocks in such a way that the different developments and or land uses can share public/multifunctional spaces ○ ensure privacy and security of the respective operators can be respected
Legibility	<ul style="list-style-type: none"> • When designing at the level of the block, encourage common areas to be rationalised and partly visible from outside • When designing at the level of the block, ensure entrances are rationalised and located in highly visible and logical locations such as corners or centre points. The integration of horizontal and vertical circulation also preferable. • Allow entrances, gateways to developments to be expressed architecturally