

# **COVID-19 EMERGENCY DE-DENSIFICATION PROJECTS UTILISING ALTERNATIVE HOUSING TYPOLOGY**

**150 UNITS AT  
PARKINGTON, HAVELOCK ROAD, EZIMBELENI**







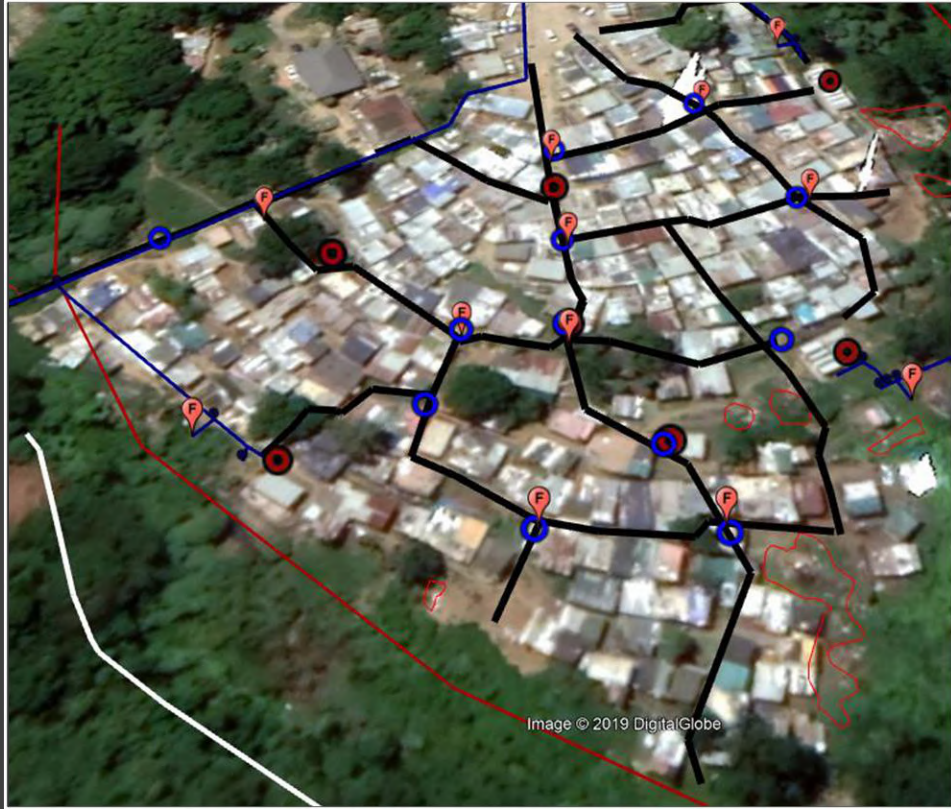
# Informal Settlements in eThekwin

- Over 580 urban informal settlements comprising 287,000 households.
- Comprising nearly a quarter of the City's population.
- Continued urbanization and scarcity of well located land.
- Over 80 years to overcome just the informal settlement backlog by means of conventional housing delivery.
- Challenging topography, high densities and many settlements within environmentally sensitive areas
- 112 settlements comprising >1000 households
- 77% are category B1 (incremental in-situ upgrade with essential services) - 342 settlements, 220,000 hh
- Many are very dense (200+ du per hectare)
- Only <3% of hhs earmarked for relocation (due mainly to sites being unsafe for habitation)





# Alternative servicing approach for dense B1 settlements - why is an alternative approach needed?



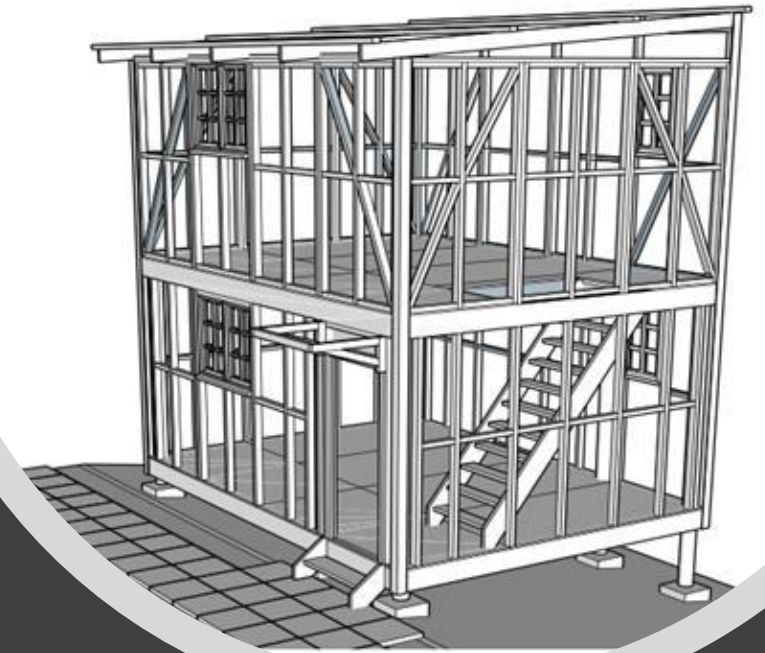
- **Significant numbers of these settlements**
- **High level of vulnerabilities** - typically the most vulnerable e.g. fire, disease, overcrowding, squalid living conditions.
- **Most are old, well established and in prime locations** (work, social services).
- **Incremental services approach currently 'reactive'** – CABS on edges, minimal footpaths on existing alignments, no reworking of space, limited/no internal water and sanitation.
- **Conventional upgrading not possible** due to densities, non-qualifiers, lack of alternative land, steep slopes, geotech., costs and other factors
- **Settlements are developmentally 'locked'** UNLESS there is an alternative approach
- **COVID-19:** need to open up space for better W&S services + reduce queuing at communal taps and toilets

# What does the revised services 'frame' approach consist of?

- Main priority is to **establish the main services access ways (main 'frame')** which breaks the settlement up into more manageable 'blocks' and brings essential services into the settlement so they are more accessible, instead of being located at the edges.
- **Typical services provided on the frame** include: footpaths, storm-water controls, mini-communal ablutions, fire hose points, standpipe wash facilities, electricity, solid waste containment bins. All except services electricity are communal, but the potential for individual connections is created for the future. Informal structures are electrified once the frame is established.
- **Limited re-blocking, relocations and reworking of space sufficient** to establish the frame (compared to conventional, formal upgrading)
- **Consolidation of intra -blocks occurs as a later phase** including housing improvements and possible individual connections. Use of the alternative housing typology developed can assist in more functional consolidation over time.

**Alternative double-story typology** – 150 units to be built on 3 re-blocking-relocation sites (Parkington, Havelock and Ezimbeleni) to release space for the services 'frame' in the adjacent settlements

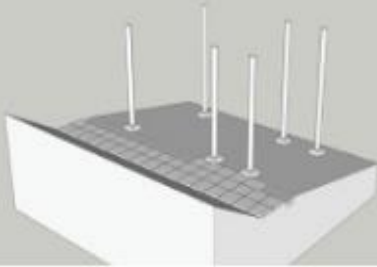
- **Acute scarcity of well-located land** in eThekweni. Most dense settlements are well-located but the land is steep.
- **Conventional upgrading not viable** on these sites - RDP housing would mean massive relocations + destabilize the slope; conventional multi-story walk-ups (flats) not viable because of high unit costs.
- **Alternative typology developed in collaboration with HSRC and team of architects and engineers according to principles of rational design.**
- Double-story, low-cost, lightweight, timber-frame structure, micro-pile foundations & external metal cladding – **locally-built and can function effectively on steep slopes.**
- Units enable a **more functional alternative urban form** on eThekweni's typically steep sites – double story, so optimise limited land availability.
- Units are **built/assembled on site by local artisans and workers in a PHP-type model.**
- Objective is to **imbed within communities a different way of building** for themselves (either organically or via with PHP support).
- **Units are engineer-certified. Parallel process for certification of the typology and/or development of new norms and standards.** Typology falls outside of current SANS10400 code norms (which are guidelines orientated towards conventional structures), but through rational design it complies in all material respects with the NBR requirements for a category one building (in terms of space, structure, health and safety etc.). Extensive work has been done to address fire performance including engagement with eThekweni Fire Department and specialist Fire Consultants. Burn tests via a fire laboratory are planned as well as future Agreement Certification .



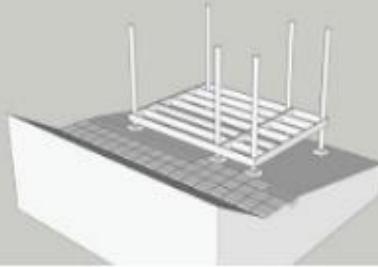




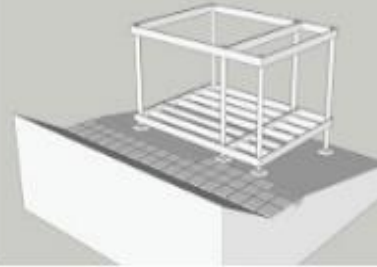
1.jpg



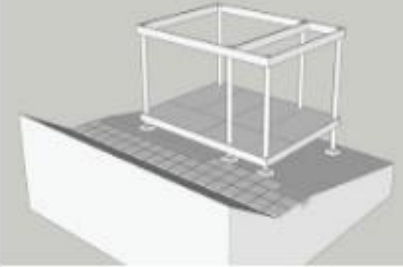
2.jpg



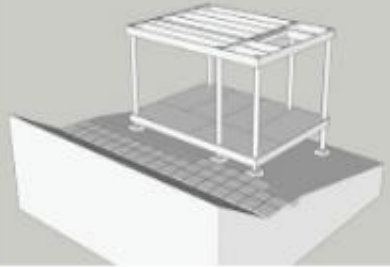
3.jpg



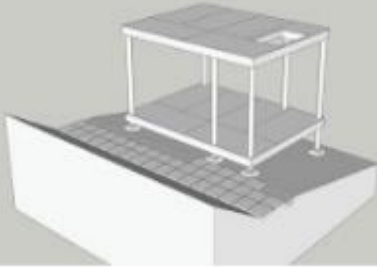
4.jpg



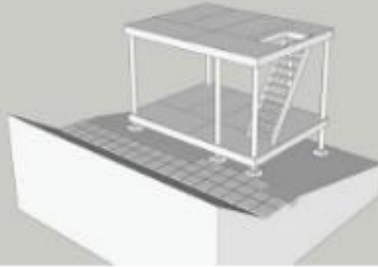
5.jpg



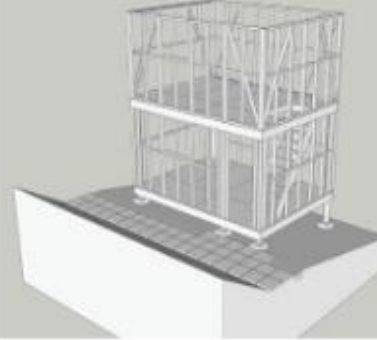
6.jpg



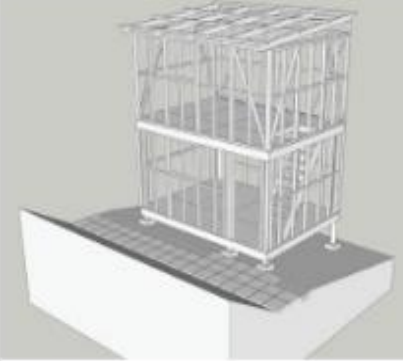
7.jpg



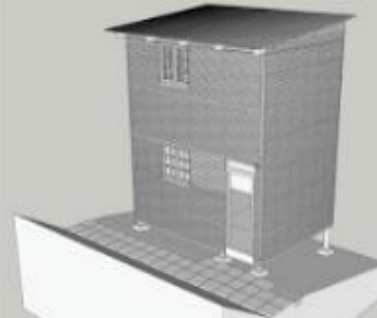
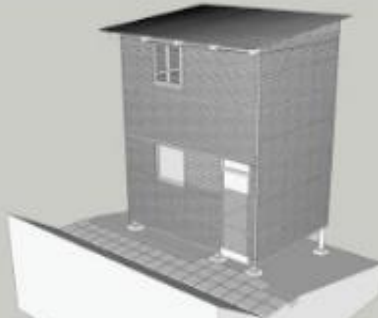
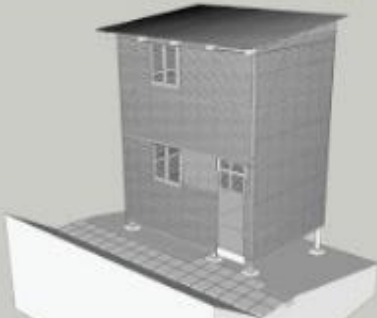
8.jpg



9.jpg



10.jpg





# Demonstration unit at Parkington



Dismantling existing informal structure



Augering micro-pile foundations



Engineer certifying foundations







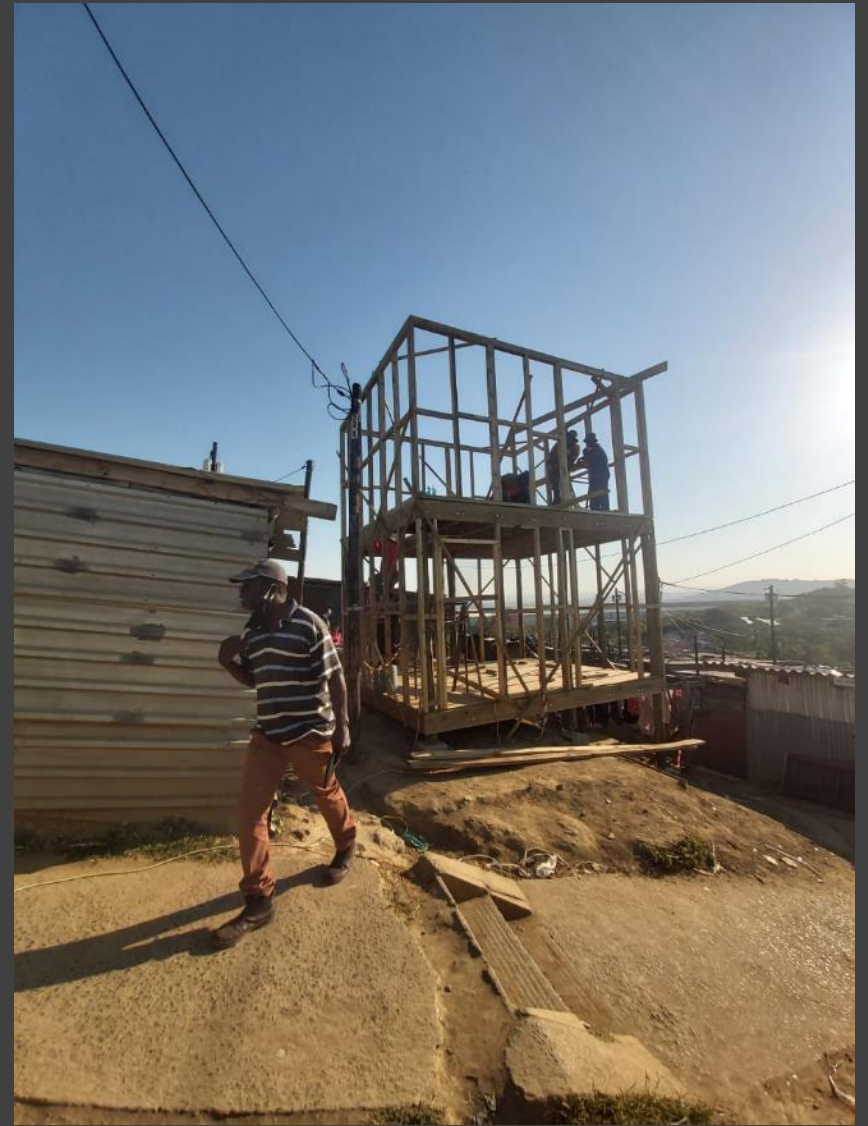
Local artisans and workers trained, empowered and supported to build the house





Framework for ground floor





Framework for 2<sup>nd</sup> floor





Stairs & roof structure in progress- roof sheets, windows, doors, external and internal cladding, and insulation to follow





External cladding being installed



Internal cladding – gypsum board option downstairs - 30 minute fire rating, easy to install, preferred option for pilot site rollout at this point



Internal cladding – pallet wood option upstairs – readily available and favoured by residents but awkward to fire treat unless there is a delivery model at scale





Finishing touches to the unit including stairwell & electrical connection







Handover of demo unit on 01 September 2020 and occupation by beneficiary



# Design process

- **Research** : Assessment of different types of structure and materials that can meet the geotechnical, slope, cost, local builder and other requirements.
- **Design**: Architectural design with structural engineering input. 10 sub-typologies developed: micro, small, medium and large – single and double story variations (ranging from 15sqm to 45sqm).
- **Demo unit**: Intermediate 31sqm double story unit developed and built at Parkington.
- **Rational design**: Unit developed on the basis of rational design. Meets all requirements of NBR on this basis e.g. in terms of structural integrity, ventilation, fire, floor space etc.
- **Refinement**: Substantial refinements to design via pilot unit in areas such as internal cladding and stairs. Visits and inputs on demo unit from: eThekweni building inspectors, Planning Unit, Human Settlements Unit, HDA, etc. NHBRC visit. All inputs assimilated.
- **Fire**: Two fire experts consulted. Fire report provided which confirms structure is safe.
- **Authorisation for pilots**: Pilot units provided on emergency sites as temporary
- **Future authorisations**: Solution for alternative standards required.



# Shortlisted sub-typologies for pilot sites

Sub-typology	Enclosed floor area (m2)	Footprint area (m2)	Cost (materials, training, labour, supervision, fees, P&G)	Cost per m2	Parkin g-ton	Ezim- beleni	Hav- elock	TOTAL units
Intermediate single storey	15,4	15,4	R52 150	R3 393	12		37	49
Medium single storey	17,9	17,9	R60 726	R3 393	0	7	0	7
Intermediate double storey -internal stair	30,7	15,4	R79 550	R2 588	39	7	26	72
Medium double storey – internal stair	34,4	17,9	R87 032	R2 530		10		10
Large double storey - internal stair	44,6	22,3	R107 709	R2 415	9	6	4	19
					60	30	67	157



# eThekwini Incremental Planning Approach – Draft Standard Operating Procedures

- Categorisation & related implications for: planning arrangements, municipal services, land, tenure, building, essential social services
- Spatial planning e.g. SDF inclusion/designation as the minimum
- Land use planning – including social compacts as basis for upholding ‘rules’:
  - TDA (B2)
  - IDA1 (B1)
  - IDA2 (B1+)
- Private land
- Notices to landowners
- Statutory servitudes
- Land acquisition
- Tenure security
- Social compacts.



## Incremental Development Area Level 1 (IDA1)

This would be **applicable to all category B1 settlements or portions of settlements (i.e., in-situ upgrades) as a minimum, 'entry-level' land use category.** This should be regarded as a temporary, incremental planning solution. The level of service would typically be higher than for TDA1, services should be undertaken in such a way as to **minimize abortive costs** and form part of longer term permanent solutions to the extent possible, and efforts should be made where necessary to **rework space to create main access ways (also known as partial re-blocking or the provision of a 'services frame')**. Refer also to details in the detailed categorization table in section 1 relating to planning, services, land and tenure etc.



# Incremental Development Area Level 2 (IDA2)

This land use level should be assigned as a next phase for category B1 settlements and **may be regarded as an alternative 'less-formal' permanent or semi-permanent solution on sites where formal town planning and township establishment are not viable in the medium term. This should be considered once the following preconditions have been achieved: once land has been acquired; once there is a detailed settlement layout (as household/site level); and subject to other social preconditions such as a list of all resident households and the absence of local contestations (e.g. relating to sub-rentals).** This land use assignment should enable the possibility of incremental individual tenure solutions once they have been developed and the capacity for local administration is in place (e.g. a municipal certificate of occupation linked to a GPS point once land has been acquired and a municipal tenure certificate once there is a full layout and each certificate can be linked to a specific residential site boundary and subject to conducive social conditions). Refer also to details in the detailed categorization table in section 1 relating to planning, services, land and tenure etc.



**Additional land use norms which should apply to all informal settlement land use types and which should also be supported by social processes and preferably reflected in social compacts at least for category B1 settlements and preferably also for B2 settlements where social conditions permit:**

- **Payment for services:** Residents should be expected pay for certain services. Currently the only service residents pay for is electricity (once their informal structure is connected). Other shared services such as communal ablutions are provided free of charge. The cost of operating maintaining services within informal settlements is high and financially unsustainable for the Municipality and new solutions need to be found, including the possibility of residents paying for a high level of shared service where it can be located closer to their dwelling (e.g. a mini-CAB shared by a small number of households).
- **Illegal connections:** Residents should desist from illegal connections including to the municipality's electrical, sewer or water grid. This relates closely to the issues of payment for services and operational sustainability thereof.
- **Further occupation of land:** Residents should assist the municipality in preventing further occupation of land and further densification of the settlement, especially where the settlement is already dense and further settlement makes servicing more difficult. This includes leadership immediately reporting any new settlement to the Municipality's Land Invasion Unit and working constructively with the Unit.
- **Responsible use of municipal services:** Residents should use municipal services responsibly and with appropriate care (e.g. avoid throwing foreign matter into toilets, desisting from vandalism and illegal connections). Community leadership should report incidents of vandalism or faults with services immediately to the Municipality and assist in discouraging such behavior. Local, community-based maintenance approaches can be considered to assist in achieving this objective.
- **Solid waste:** Residents must ensure that their own household solid waste is placed in black rubbish bags and moved to the nearest municipal collection point either inside or on the edge of the settlement. The Municipality will assist wherever possible in providing a certain number of black plastic bags to settlements and might also assist with stipends for waste collectors, but the responsibility remains with each household to manage its solid waste responsibly.
- **Building materials:** Residents should desist from using highly flammable building materials such as plastic and cardboard. At IDA2, it should be agreed that residents endeavor to build to a higher standard (e.g. either using the norms for BNG housing where sites are relatively flat or the lightweight wood-frame housing typology recently developed for steep slopes in eThekweni) and that they utilize build double story structures where possible to make more efficient use of space and maintain access ways. Standard designs for selected typologies should be provided by the municipality to residents. Consideration will be given to establishing a PHP-type housing support programme to enable residents to build higher quality housing themselves

# Policy implications

- **Policy imperative:** Need for more flexible approaches to building standards within the context of: scale of settlements in eThekweni IS, 77% of being permanent B1; draft incremental planning protocol in terms of which we will have IDA1 and IDA2 – latter creating a platform for an alternative less formal permanent end state; inability of state to provide most people with an 'RDP' house; inability of most people to build to NHBRC standard; incompatibility of conventional structures with steep slopes typical of most dense well located eThekweni settlements; need to improve safety of housing in informal settlements through owner-driven and owner-funded improvements.
- **Policy recommendation 1:** Accept and support incremental development areas where there will be alternative/incremental planning, service and top structure standards
- **Policy recommendation 2:** Establish a new NHBRC standard for the alternative typology developed for eThekweni noting that this meets almost all building regulation requirements on principles of rational design.
- **Policy recommendation 3:** Identify very basic building guidelines (falling at a lower threshold relative to the above) which people residing in informal settlements can utilise to when building 'shacks' – e.g. most key things to avoid materials wise (e.g. plastic, cardboard etc.), small things that can be done to maximise structure quality and reduce risk (e.g. adding an internal gypsum board cladding).



# Allocations

- The alternative typology emergency units are **only allocated to households residing within the alignment of the services frame** to be delivered the informal settlement.
- **Relocations are entirely voluntary** and are negotiated on a household-by-household basis.
- The housing units provided are **provided as compensation for the relocatees** for the informal structures which they are losing. **Units are NOT provided as part of state housing delivery to address housing backlogs, but to unlock incremental in-situ upgrading and essential services provision.** They are a type of emergency housing.
- The housing provided is thus **quite distinct from mass housing** provided under the Municipality's housing programme and is instead provided in order to 'unlock' incremental, in-situ upgrading.
- **Each relocatee gets a significant upgrade on housing quality and a slight space upgrade** - a better quality house than their current informal structure, and one which is also in most cases slightly (but not much) bigger. A mix of different size units is thus available.
- Although relocations undertaken as per emergency housing process (where units are designated as temporary), the **typology is suitable for long-term use**, the sites are suitable and well-located and there is the potential to regard them as permanent once acceptance of the new typology has been secured.

# PHP-type delivery approach – maximising local opportunities

In contrast to conventional TRA/emergency units where most of the labour/manufacturing is off-site, these **units are manufactured and assembled entirely on site in a PHP-type delivery method**. The construction is labour intensive. This creates significant and much-needed local opportunities, not only for general labourers, but also for local artisans (and small sub-contractors) to get work and be upskilled. **A much greater portion of the total budget is for labour and artisans/sub-contractors than with the prefabricated TRA units** which are currently being built on most de-densification projects where a larger portion of the revenue goes to large manufacturers/suppliers. **This also starts to embed the new technology, typology and building methods into communities so they can be assimilated, accepted and replicated.**

To make this happen effectively, the **main contractor needs to be able to build in an appropriate fashion, working closely with the community and local workers/artisans and maximising local work content and skills transfer**. The contractor needs to be able to **train, empower and support local artisans and general workers and support locally-driven construction** rather than build the housing for the community/beneficiaries. This is a PHP-type model of delivery. It is emphasised that the **long-term goal is to enable a low cost, alternative typology which can be replicated and scaled up** so that the top-structures in informal settlements can be improved without necessitating massive relocations or massive state spend. As indicated previously, the units are relatively low tech and use familiar, readily available materials from any local hardware store.



# Shortlisted sub-typologies for pilot sites

Sub-typology	Enclosed floor area (m2)	Footprint area (m2)	Cost (materials, training, labour, supervision, fees, P&G)	Cost per m2
Intermediate single storey	15,4	15,4	R52 150	R3 392,50
Medium single storey	17,9	17,9	R60 726	R3 392,50
Small double storey - external stair	26,8	13,4	R72 403	R2 702,50
Intermediate double storey -internal stair	30,7	15,4	R79 550	R2 587,50
Medium double storey – internal stair	34,4	17,9	R87 032	R2 530,00
Large double storey - internal stair	44,6	22,3	R107 709	R2 415,00