

Corporate Presentation

FBR Limited
October 2023



Corporate Snapshot

Capital structure

Market capitalisation (as at 05 Oct 2023)	\$107.9m
Ordinary shares on issue	3.7b
Average daily volume (last 3 months)	2.4m
Gross cash balance (as at 30 Jun 2023)	\$13.4m

Directors & Management

Richard Grellman AM	Non-Executive Chairman
Grant Anderson	Non-Executive Director
Greg Smith	Non-Executive Director
Nancy Milne AOM	Non-Executive Director
Mike Pivac	Executive Director – MD & CEO
Mark Pivac	Executive Director – CTO
Aidan Flynn	CFO & Company Secretary
Kiel Chivers	Chief Commercial Officer
Jonathan Lawe Davies	General Counsel

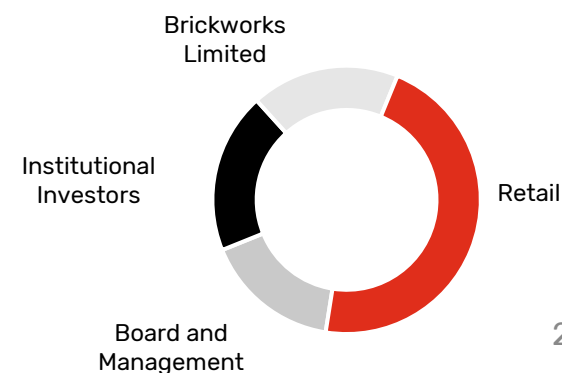
Share price performance (24 months)



Shareholders

Brickworks (ASX:BKW)	17.9%*
M & G Investments	10.9%*
Fidelity	9.9%*
Mark Pivac (Founder)	9.8%
Mike Pivac (Founder)	4.2%

Register



*as per last substantial holding notice

Significant commercial opportunity poised to scale

Company Highlights



- **A unique value proposition as the most advanced, fully autonomous, dynamically-stabilised construction robot in the world**
- **Next-generation Hadrian X[®] exceeds lay speed record of predecessor, improving economics - further increases expected**
- **To date have completed or contracted 32 structures¹ (incl. two large commercial properties)**
- **Significant 'first-mover' technological and commercial advantage backed by strong 100% owned IP portfolio**
- **Compelling target economics as part of FBR's Wall as a Service (WaaS[®]) business model²**
- **Large global market opportunity with macroeconomic tailwinds as housing demand outpaces supply**
- **Funding already received from M & G Investment Management for three next-generation Hadrian X[®] robots to expedite U.S. market entry**
- **Partnered with leading global industry participants**



1. Includes six residential houses, two large commercial properties and 24 townhouses.

2. Based on Company assumptions provided on slide 22 and 23 of Investor Presentation released via ASX on 26 October 2022, utilising Hadrian X[®] H110 and presently available block sizes. Access to larger blocks would have the potential to increase comparative speed within the limits of H110 compatible blocks.

Automation is widely regarded as the future of construction

Hadrian X[®] Solution

- Hadrian X[®] is the world's most advanced construction robot, capable of building the structural, load-bearing walls of a brick/block house in as little as a day
- Designed to build structures safer, faster, cheaper and more accurately, with waste virtually eliminated compared to traditional manual methods
- FBR's Dynamic Stabilisation Technology[®] (DST[®]), enables the Hadrian X[®] to take the precision of traditional indoor robotics into dynamic outdoor environments on a fully mobile truck-based platform
- Compliant with building codes in Australia and the U.S.
- Wall as a Service[®] offering provides builders with certainty on timing, cost, safety and waste through robotically constructed 'wall on call'
- FBR's flagship next-generation Hadrian X[®] features significant improvements to speed and capability, furthering FBR's economic and competitive advantages



House constructed using Wienerberger Porotherm – world's largest clay blocks



Hadrian X[®] building a structure in Wellard, generating zero on-site waste



Reducing risks to health, safety and the environment

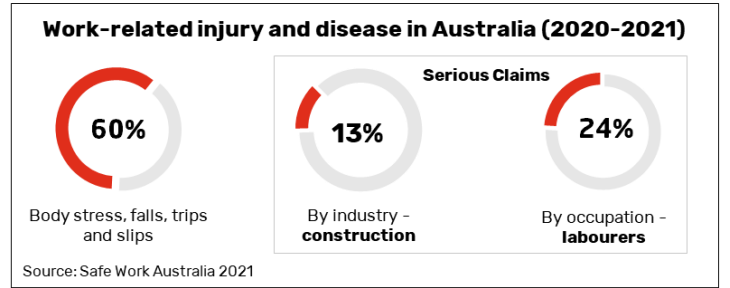
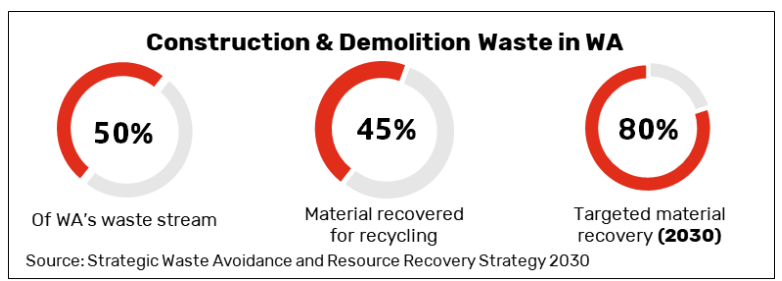
Improving Sustainability in Construction

Environment

- Reduced environmental impact of construction process through **zero-waste sequenced pallet** capability:
 - maintains site cleanliness, massively reduces water use, waste generation and subsequent cost of waste removal to landfill
- No sand, cement or water required on site, eliminating;
 - impact of extraction, soil screening, removal and management of leftover waste; and
 - potential exposure to hazardous silica dust, protecting the local environment, workers and public within vicinity
- **Block agnostic laying capability, ensuring forward compatibility with future developments in sustainable block materials**
- Up to 10% of bricks are wasted in manual bricklaying. This equates to ~A\$15 billion waste in the A\$175 billion of global brick/blocks produced and sold annually, of which >50% could be mitigated utilising Hadrian X®

Health & Safety

- **Reduces occurrences of repetitive stress injuries** and strains, while virtually eliminating risks during the undertaking of procedural construction tasks
- **Removes virtually all manual labour** from construction site during structure build (except minimal FBR quality control interactions)
- Due to the use of construction adhesive, there is no exposure and inhalation of cement and sand dust while mixing mortar. Both contain silica which has been recognised as a serious industry hazard
- No injuries due to heavy manual handling of products - **Hadrian X®** handles, cuts and delivers all bricks necessary for the job
- **Less people required at work site** during construction and less trips to site required by workers

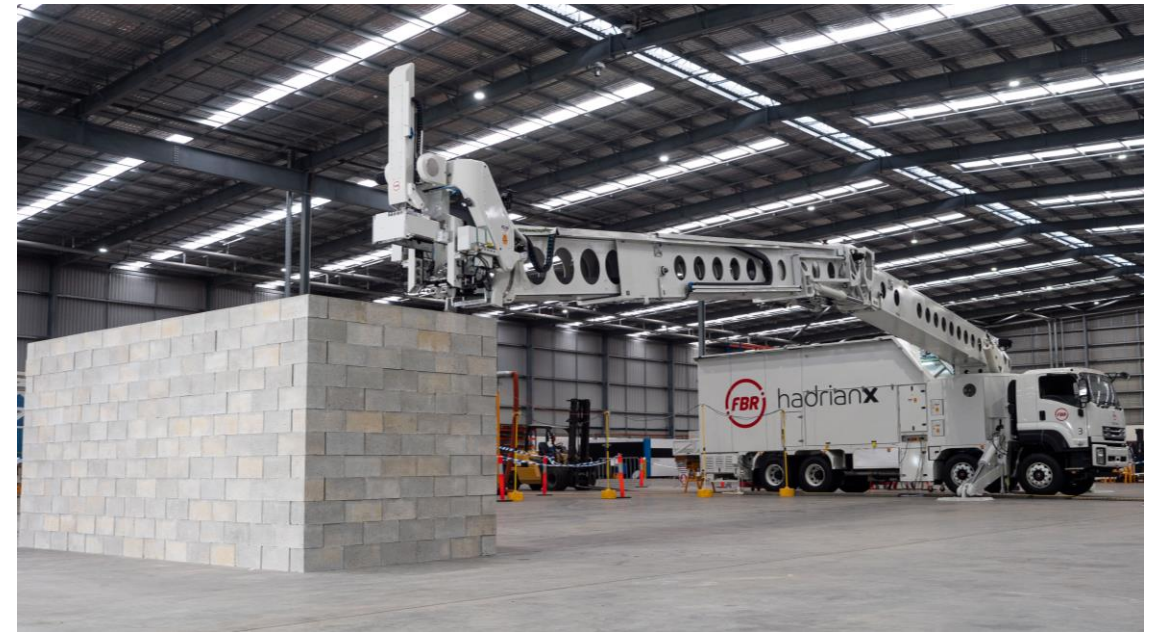




Technological breakthroughs for the digitalisation of the construction industry

Next-generation Hadrian X[®]

- Next-generation Hadrian X[®] exceeded previous generation's peak lay speed record, laying U.S. format masonry blocks at a peak rate of over 300 blocks per hour with further expected improvements
- Following outdoor site demonstrations, the next-generation Hadrian X[®] will be ready for demonstration work in a suburban environment
- Second next-generation Hadrian X[®] currently in production (previously Australian spec) will be fitted to a U.S. truck chassis as soon as available and deployed to the U.S. to provide WaaS[®] in Florida
- A third next-generation Hadrian X[®] has commenced production, and procurement for a fourth, fifth and sixth next-generation Hadrian X[®] has commenced



Next-generation Hadrian X[®] completes test build with lay-path vectoring



Next-generation Hadrian X[®] with a new HMI, can be operated by tablet

Automation is widely regarded as the future of construction

Technical Specifications

- Modular design with distributed control architecture
- Operable by tablet or mobile device
- Shuttle system handles blocks up to 600 x 400 x 300mm (23 Standard Brick Equivalent, weighing up to 45 kgs); capable of being adapted to lay roof tiles
- Larger blocks allow for increased targeted lay speed to ~75-120m²/hour
- 32-metre-long telescopic boom capable of building three storey structures from roadside
- Brick saw module capable of making height, mitre and gable cuts as required
- Simple mobilization to site with storage compartments on the Hadrian X[®] for ancillary equipment and towing capability for a telehandler for loading
- Two-phase MOU with Liebherr-Mischtechnik, the world's largest privately owned OEM, to collaborate on commercializing the next-generation Hadrian X[®] ensuring suitability to mass manufacture²



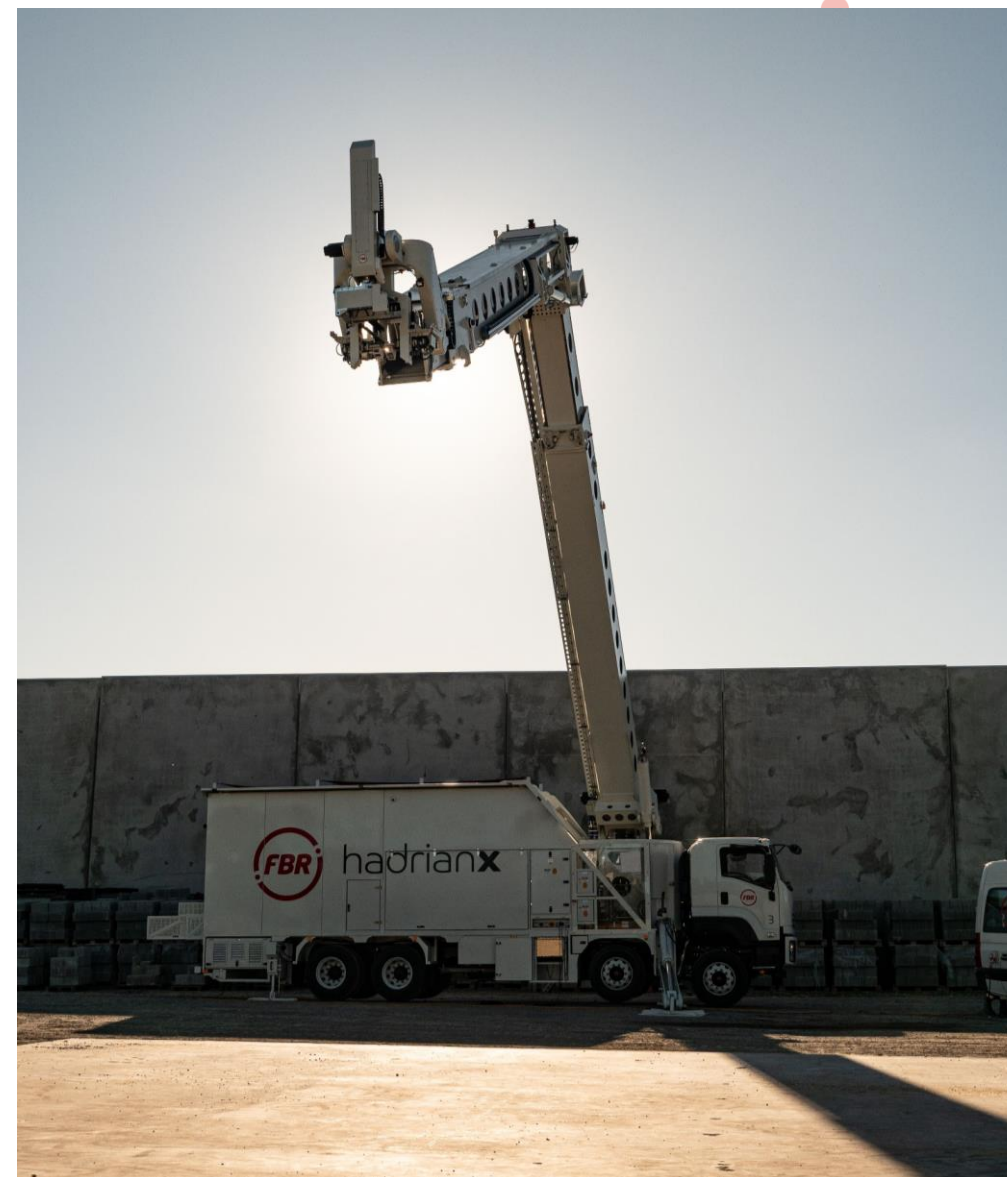
Next-generation Hadrian X[®] builds test structure with lay-path vectoring to close perpendicular gaps

1. Based on Company assumptions provided on slide 22 and 23 of Investor Presentation released via ASX on 26 October 2022, utilising Hadrian X[®] H110 and presently available block sizes. Access to larger blocks would have the potential to increase comparative speed within the limits of H110 compatible blocks
2. Refer FBR ASX announcement released 3 March 2022.

Next-generation Hadrian X®

Outdoor Testing

- Following calibration and optimisation activities undertaken indoors at FBR's facilities, the next-generation Hadrian X® mobilised outdoors at FBR's facilities to simulate work in a dynamic outdoor environment
- During the completion of its first compliant outdoor structure, the next-generation Hadrian X surpassed its previous peak lay speed record, reaching speeds of 326 blocks per hour
- In addition to the building of outdoor test structures, activities included full mobilisation protocols such as site survey, laser tracker calibration and Hadrian X® automated pack/unpack sequence





Compelling target economics provides sound business case for Hadrian X®

Hadrian X® Target Economics in Australia

Larger blocks improve **Hadrian X®** economics, and the greater the benefit is passed on to **WaaS®** customers. Costs below are direct laying costs (based on the key assumptions described below) and exclude all the other ancillary benefits enjoyed by the customer derived from the **Hadrian X®** from its improvements to safety, speed, accuracy and waste.

Methodology	Existing Block Type (L x H x W)	Laying Speed (blocks p/hr)	Times faster than single manual bricklayer	Average life cycle cost of laying wall in commercial operation (A\$/sqm)	Standard double brick houses built per year
Manual Bricklayer	Standard Clay Maxibrick 305 x 162 x 90mm	42	1x	\$57	10
Hadrian X® (previous generation)	Concrete Masonry Unit 390 x 230 x 90mm	174	7x	\$35	83
Hadrian X® (previous generation)	Porotherm Clay Block External: 500 x 249 x 250mm Internal: 500 x 249 x 115mm	174	14x	\$18	166
Next-generation Hadrian X®	Concrete Masonry Unit 390 x 230 x 90mm	300	12x	\$20	142
Next-generation Hadrian X®	Concrete Masonry Unit 390 x 230 x 90mm	500	20x	\$14	237
Next-generation Hadrian X®	Porotherm Clay Block External: 500 x 249 x 250mm Internal: 500 x 249 x 115mm	500	41x	\$7	476

Key Assumptions: Hadrian X® manufacturing cost at scale: A\$1 million. Hadrian X® crew: 2 people per 12 hour shift. Hadrian X® useful life: 12 years. Number of 12 hour shifts per year for Hadrian X®: 252. Hadrian X® maintenance and fuel cost per year: A\$175,000. Hadrian X® laying cost excludes corporate overheads. Standard double brick house has 351 vertical sqm of wall (237m² internal facing and 114m² external facing). Manual bricklayers work in a crew of three (two bricklayers and one labourer). Manual crew lays 1,000 maxibricks per eight-hour day. Equivalent to 108 standard bricks per hour per person. Manual maxibrick laying cost, taking one to two weeks (laying only) would be currently A\$2.50 per maxibrick laid in Perth, WA, plus allowing for mortar and sundries and cut bricks this equates to approximately A\$57/sqm wall laid. Hadrian X® laying speeds are averages ignoring planned and unplanned maintenance.

Current Projects



FBR's largest and most complex project to date

Willagee

- Split across two sites, each containing eight two-storey units
- A number of first-time accomplishments for FBR such as:
 - building on a rising site, with each home elevation varying;
 - triple-leaf, common party walls up to 9.2m high;
 - a triple-leaf cavity wall system with acoustic brick ties; and
 - steel reinforcements and fireproofing
- FBR mobilised to the site again in July 2023 following the pouring of the second storey slabs at the northern group of townhouses
- Hadrian X[®] will complete the second storey walls before completion of follow up trade work to finalise the project

Willagee - Hadrian X[®] Stats

Type:	Multi-dwelling Residential
Layout:	16 x two-storey townhouses (3x2)
Wall Area:	3,138m ²
Block Type:	Brickworks CMU 400
Blocks:	35,893 (Approx. 148,000 SBEs)

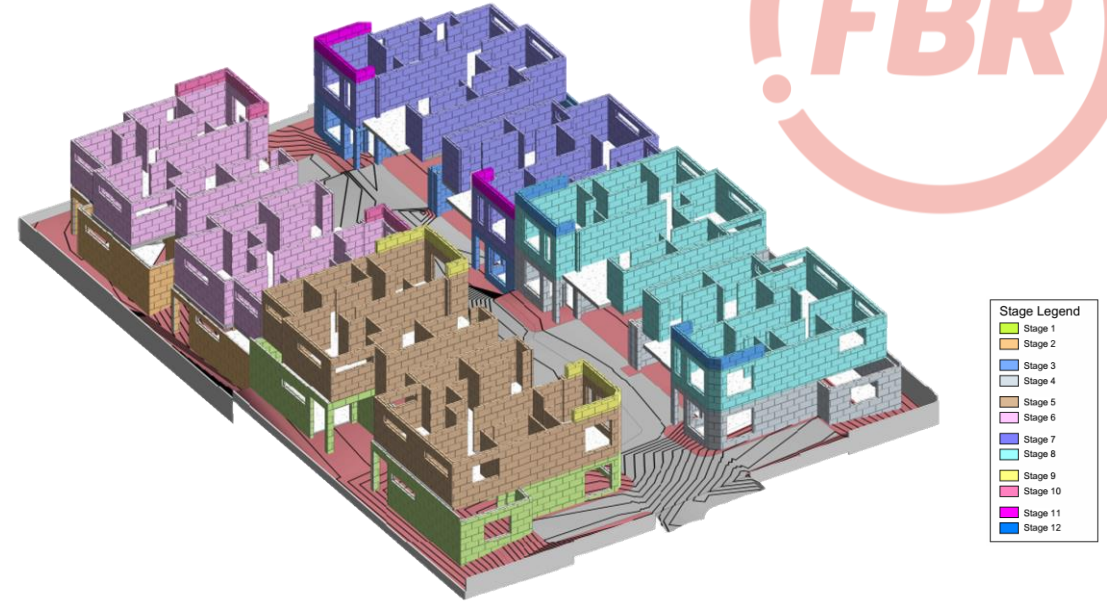


Final phase of works at Willagee sees blocks laid of second storey triple-leaf walls at the northern wing

Multi-storey high-density project in Perth's suburbs

St. James

- FBR contracted by Perth developer, Riculallo Pty Ltd, to provide Wall as a Service® for eight two-storey townhouses in Perth suburb of St. James
- Hadrian X® is scheduled to mobilise to site during Q2 FY24, in line with schedule provided by the developer



TAD 3D render of St. James Project

St. James - Hadrian X® Stats

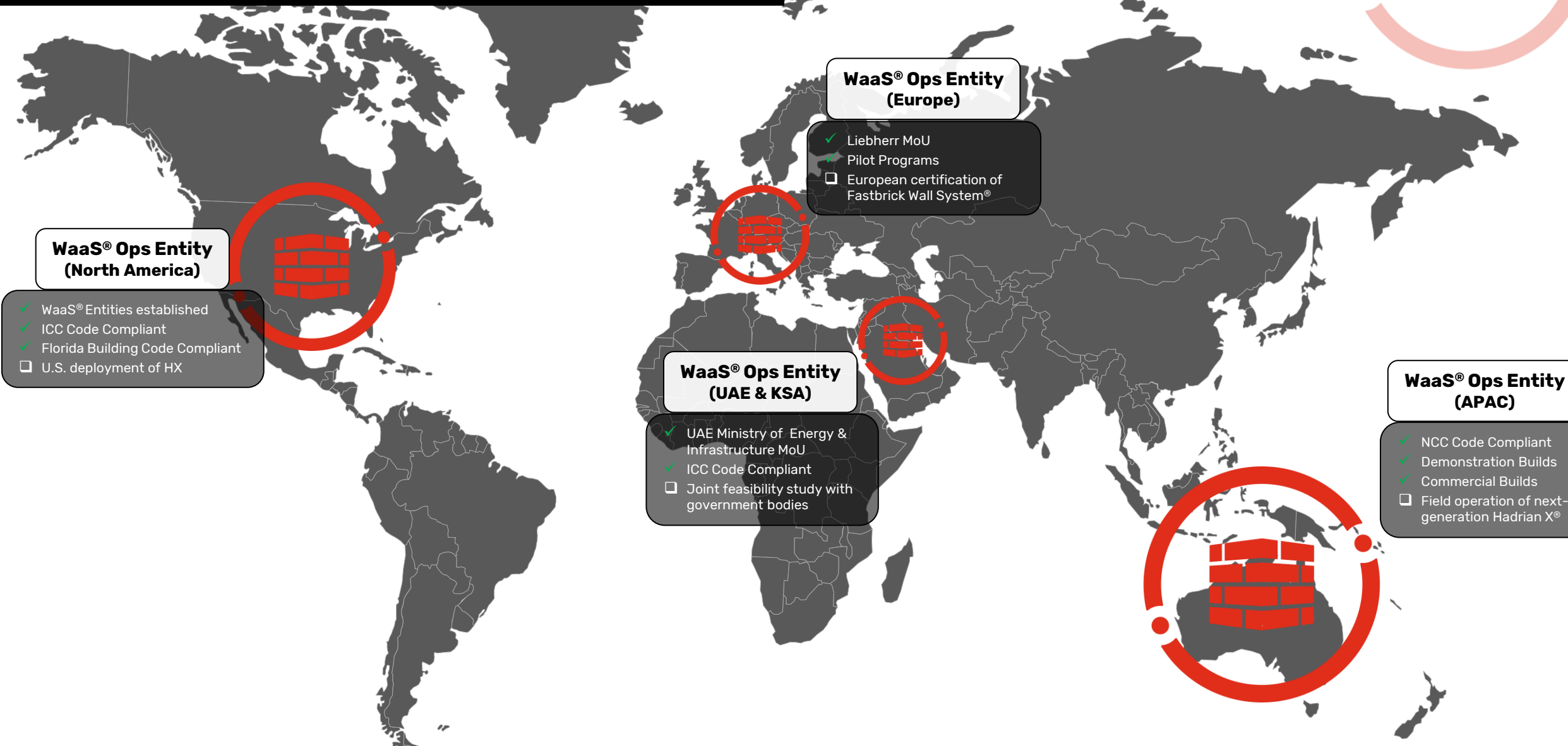
Type:	Multi-dwelling Residential
Layout:	Eight x two-storey townhouses
Wall Area:	4,056m ²
Block Type:	Brickworks CMU 400
Blocks:	35,893 (Approx. 148,000 SBEs)



WaaS[®] Commercialisation Strategy



Global Expansion Strategy



WaaS® Ops Entity (North America)

- ✓ WaaS® Entities established
- ✓ ICC Code Compliant
- ✓ Florida Building Code Compliant
- ☐ U.S. deployment of HX

WaaS® Ops Entity (Europe)

- ✓ Liebherr MoU
- ✓ Pilot Programs
- ☐ European certification of Fastbrick Wall System®

WaaS® Ops Entity (UAE & KSA)

- ✓ UAE Ministry of Energy & Infrastructure MoU
- ✓ ICC Code Compliant
- ☐ Joint feasibility study with government bodies

WaaS® Ops Entity (APAC)

- ✓ NCC Code Compliant
- ✓ Demonstration Builds
- ✓ Commercial Builds
- ☐ Field operation of next-generation Hadrian X®

WaaS® expansion and entry into FBR's largest target markets

Global Expansion Strategy

- Three next-generation Hadrian X® robots already funded by M & G Investment Management specifically for U.S. markets, expediting FBR's entry to its largest market globally
- U.S. domiciled operating entities established
- Fastbrick Wall System® compliant with U.S. building codes
- First next-generation Hadrian X® to be sent to Florida to complete build demonstrations ahead of commencement of commercial operations
- Certification of Fastbrick Wall System® underway in Europe using Hadrian-optimised block and adhesive
- MOU in place with Liebherr-Mischtechnik for Hadrian manufacturing; demonstration programs completed in Australia with major block producers Wienerberger and Xella
- Commercial discussions progressing in the U.S. with large market incumbent for establishment of WaaS® joint venture

U.S. Housing Supply Shortfall



States with new residential builds – Top 5

('000s)	2018	2019	2020	2021	2022	5 Yr. CAGR	% Single Family Homes
Texas	192.9	209.9	230.5	266.0	263.1	6.4%	59%
Florida	144.4	154.3	164.1	213.5	212.0	8.0%	64%
California	113.5	110.2	106.1	119.4	119.7	1.1%	63%
North Carolina	71.7	71.3	80.5	94.9	91.9	5.1%	70%
Georgia	59.3	53.8	55.8	67.2	77.2	5.4%	61%
U.S. Total	1,329.0	1,386.3	1,471.2	1,737.2	1,765.3	4.6%	59%

Source: US Census Bureau (2023), Moody's Analytics (2021), FRED (2023), NAHB (2023)

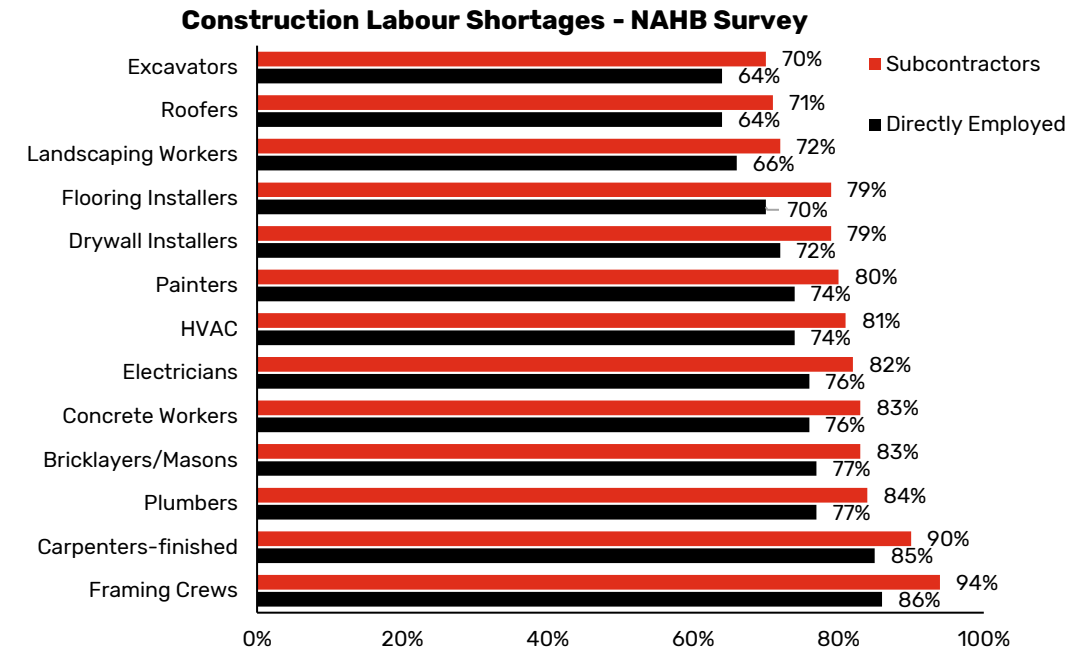
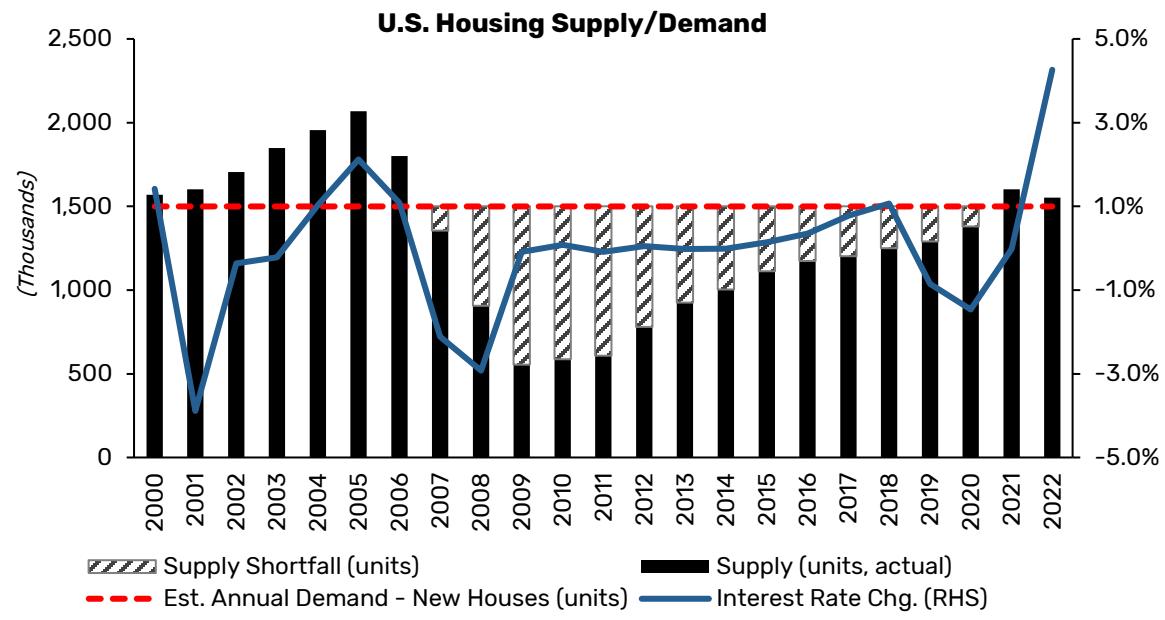


U.S. Residential Opportunity

- Moody's estimated a minimum of ~1.5m homes required annually just to meet demand¹
- Chronic undersupply has resulted in a deficit estimated to be between 4.7-20.1m, with supply response impinged by the pandemic, labour shortages and material cost inflation^(1,2)
- In a bid to curb inflation, interest rates have risen which has dampened potential rebound through tightening credit availability
- While supply recovery sees improving trend, availability of skilled labour presents challenges, as evidenced by survey of NAHB homebuilders and remodelers

Builder completions - Top 10 (2022)

Builder	Completions
D.R. Horton	82,930
Lennar Corp.	68,817
PulteGroup	29,111
NVR	22,732
Meritage Homes Corp.	14,106
KB Home	13,738
Taylor Morrison	12,647
Clayton Properties Group	11,751
Century Communities	10,594
Toll Brothers	10,515



Source: (1) Moody's Analytics (2023), FRED, (2) IZA Institute of Labor Economics (2022), NAHB (2022), Census Bureau (2023)

Two of the largest and fastest growing residential construction markets in the U.S.

Initial U.S. WaaS® Ops

- Concentration of new build opportunities in Florida and Texas is highly favourable for FBR and the operation of WaaS® operating centres
- Provides significant opportunities to provide WaaS® within close proximity to operating headquarters, with ample access to labour, materials and Liebherr facilities (Miami and Houston)
- Market made up of high-volume masonry construction, primed for robotics
- Brick and block structures account for ~25% of new home builds in the U.S., with concentration in areas prone to hurricanes (Florida / Texas)
- Florida and Texas experienced increased net migration in 2022 with +320k (to 22.2m) and +470k (to 30.0m) people respectively moving into these states due to lower costs of living, more affordable housing and zero state income taxes for individuals



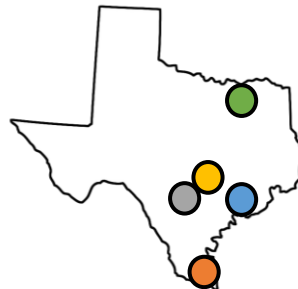
High volume residential estates in U.S. well suited to robotic construction

Texas

Metropolitan Statistical Area

New Build Permits 2022

Dallas-Fort Worth-Arlington	77,446
Houston-The Woodlands-Sugar Land	75,786
Austin-Round Rock	44,019
San Antonio-New Braunfels	24,006
McAllen-Edinburg-Mission	5,836

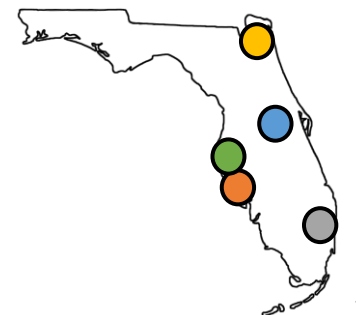


Florida

Metropolitan Statistical Area

New Build Permits 2022

Tampa-St. Petersburg-Clearwater	29,960
Orlando-Kissimmee-Sanford	28,890
Jacksonville	23,131
Miami-Fort Lauderdale-West Palm Beach	19,813
North Port-Sarasota-Bradenton	15,808

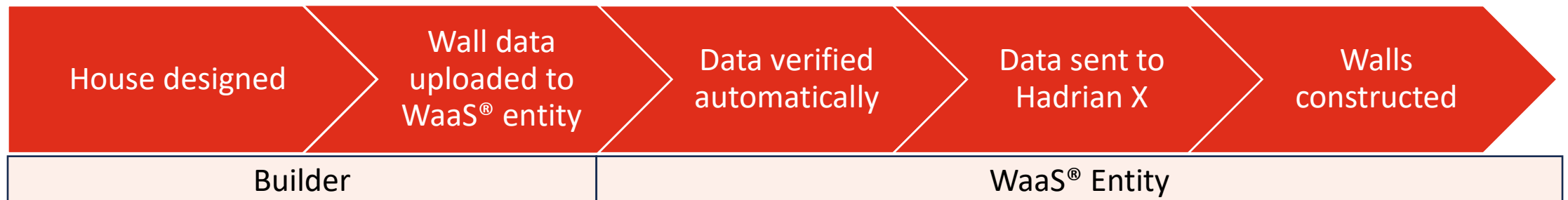




Software-driven efficiency

WaaS[®] Enabling Software

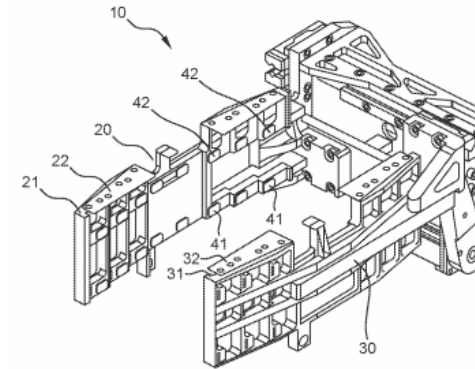
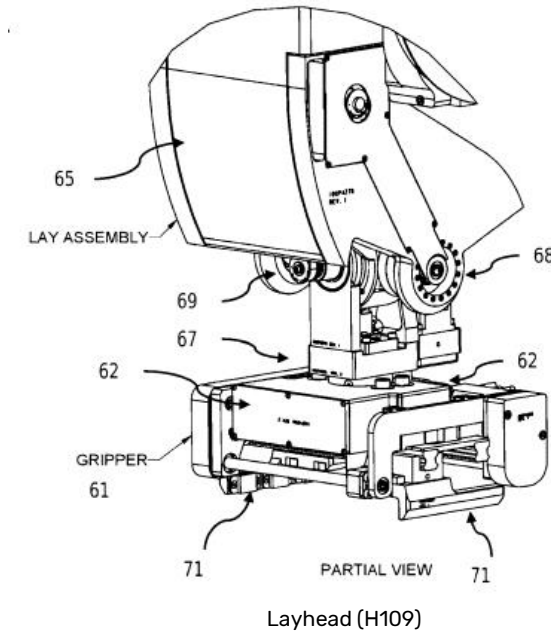
- The Architectural Designer[®], or TAD[®], is the front-end system that enables a builder to interact with the relevant WaaS[®] business to convert a house design to a set of instructions for the Hadrian X[®]
- TAD[®] provides a fully digital, automated, secure, accurate and fast system to minimize the WaaS[®] business overhead costs and maximise profitability for the WaaS[®] business and robotic construction accessibility for builders
- TAD populates blocks, prices walls, reviews builder plans for conflicts, provides a feedback loop to the builder and schedules the work for execution with a Hadrian X[®] based on a date selected by the builder
- As a simple to use plugin for popular design software AutoDesk Revit and Graphisoft ArchiCAD, designers can select from a block library relevant to the local jurisdiction to produce an accurate bill of materials, including waste statistics
- Offers the builder secure, accurate and fast transfer of wall data to the WaaS[®] business then onto the Hadrian X[®] with timing and cost certainty
- Acts as a planning and pipeline management tool for the WaaS[®] business



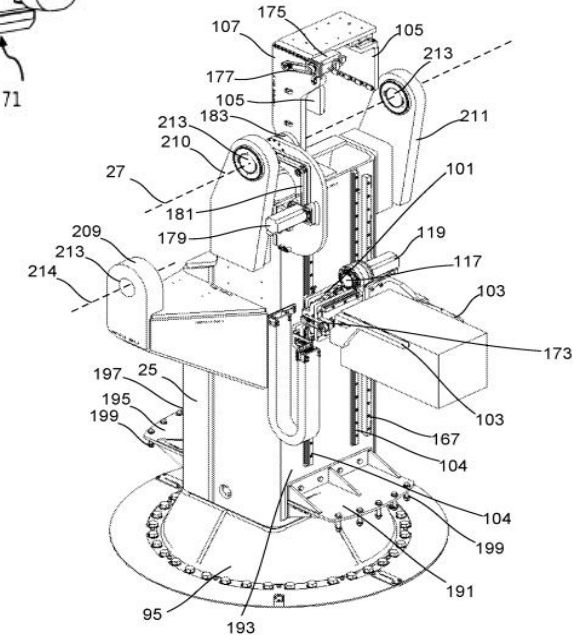
Protection of FBR's Intellectual Property

IP Portfolio

- FBR has IP coverage for its technology across Australia, United States, Europe, China, UAE, Saudi Arabia, Mexico, Canada, Japan, Indonesia, Thailand, South Africa, India and Brazil
- Patent coverage is primarily focused on key commercial markets in Australia, Europe, USA, China, UAE and Saudi Arabia (or GCC region)
- Global IP portfolio includes 34 patent families comprising over 200 applications, 90 design applications and 92 trademark applications
- Coverage includes strategic elements of DST®, Hadrian X® and Fastbrick Wall System® technology and other applications such as 3D concrete printing and TAD® software
- FBR is one of the dominant patent filers in bricklaying robotics, having particular strength in long boom stabilisation technology
- FBR stabilisation technology is unique in terms of subject matter and in terms of geographical protection



Flipper Mitt



Tower

Examples of schematics included in FBR's patent filings



Next 12 months for FBR



- Introduce next-generation Hadrian X[®] into suburban building environments
- Complete construction at Willagee and St. James
- Progress manufacture of U.S. spec next-generation Hadrian X[®] robots for deployment to U.S.
- Establish European entity and complete certification of Fastbrick Wall System[®]
- Obtain binding orders for further next-generation Hadrian X[®] robots to be positioned into operating entities in Australia, U.S. and Europe
- Work to establish U.S. operational base in readiness for the arrival of next-generation Hadrian X[®] robots



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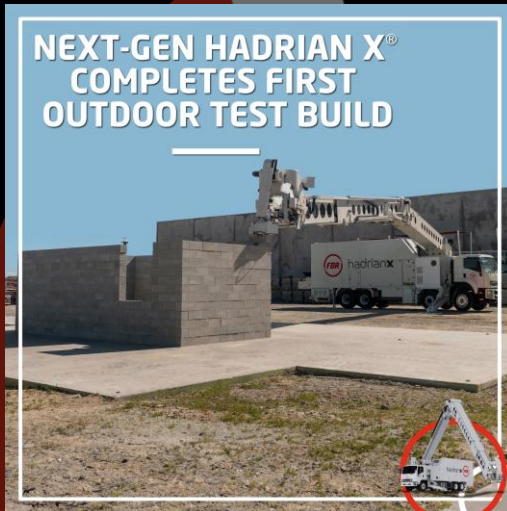
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