

WORKPLACE DENSITY

Entrant: James Holth
Email: james.r.holth@gmail.com

Supervisor: Michael Donn
Faculty of Architecture and Design

In collaboration with Studio of Pacific Architecture
Supervisor: Michael Davis
studiopacificarchitecture

Proposition

Office workplaces have become increasingly open plan and more recently the space allocation per person has been reducing. The economic benefits of reduced real estate cost are generally obvious, but what impact does this have on productivity and the work environment?

This research project analysed the effectiveness of modern open plan office environments in New Zealand. A set of key factors to test productivity were established based on existing literature and an international workplace survey was used to analyse the impact these factors had on employee productivity within five case study premises.

We will conduct an analysis of typical density measurement and establish a 'truer' method of measuring usable space for office workers.

Using this specific density measurement system, through comparison of survey data, we will analyze how different densities respond to different key factors.

Using the above method, our hypothesis is that as density increases employees will become less satisfied with their environment and their reported satisfaction with the key variables will reduce.

Case Study Buildings and Characteristics

In order to produce a diverse cross-section of results, a range of case study premises were sought. Key qualities considered were;

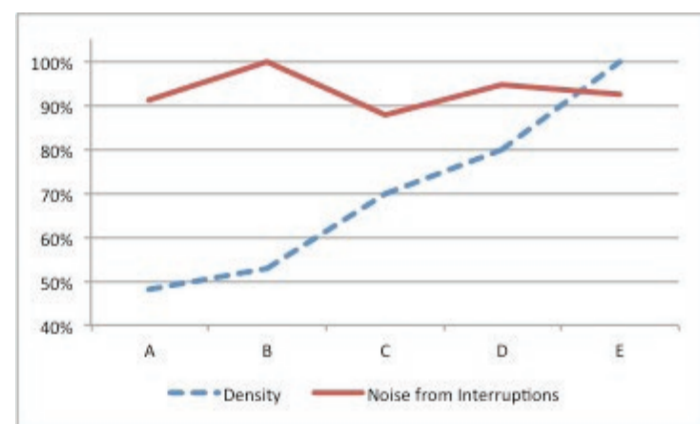
- Nature of work environment (traditional or progressive)
- Public or private sector
- Range of Densities

To preserve confidentiality each case study premise has been coded from A to E in order of increasing density (Net Occupiable Area/ person).

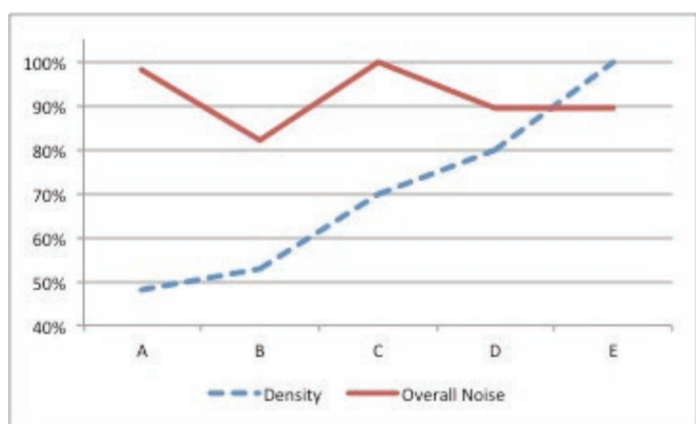


Three key variables have been predicted to have the highest correlation between density and productivity, with the additional variable of user perceived productivity included. Key factors for reporting the 'success' of an environment are personal comfort (Leaman and Bordass 8), overall noise including interruptions (Kim and de Dear) and perceived productivity (Sullivan, Baird and Donn). The resulting data has been standardised and is displayed in the graphs below as a percentage.

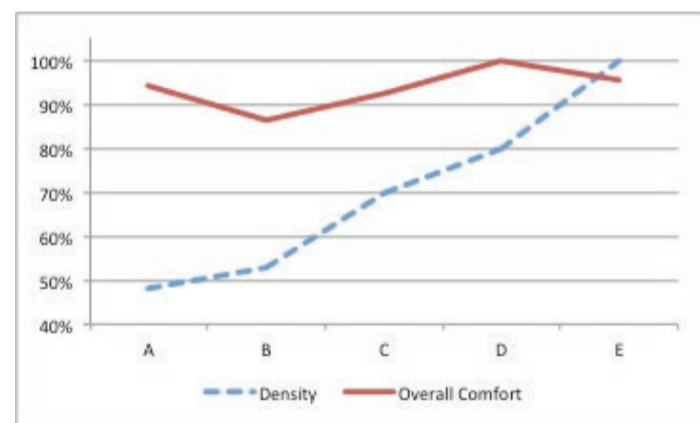
Noise from Interruptions



Overall Noise



Overall Comfort



Self-rated Productivity



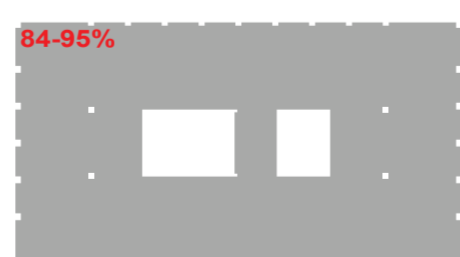
With all key variables, results fluctuate across the case study premises. Of great significance is the lack of negative trend in the data. As the premises get more dense there appears to be a neutral trend, showing density to have neither a negative or positive effect.

Kim, Jungsoo and Richard de Dear. *Workplace satisfaction: The privacy-communication trade-off in open-plan offices*. The University of Sydney, Sydney: The University of Sydney, n.d.
Leaman, Adrian and Bill Bordass. *Productivity in Buildings: the Killer Variables Update*. The Usable Buildings Trust. London: The Usable Buildings Trust, 2005.
Sullivan, James, George Baird and Michael Donn. *Measuring Productivity in the Office Workplace*. Victoria University of Wellington. Wellington: Victoria University of Wellington, 2013.

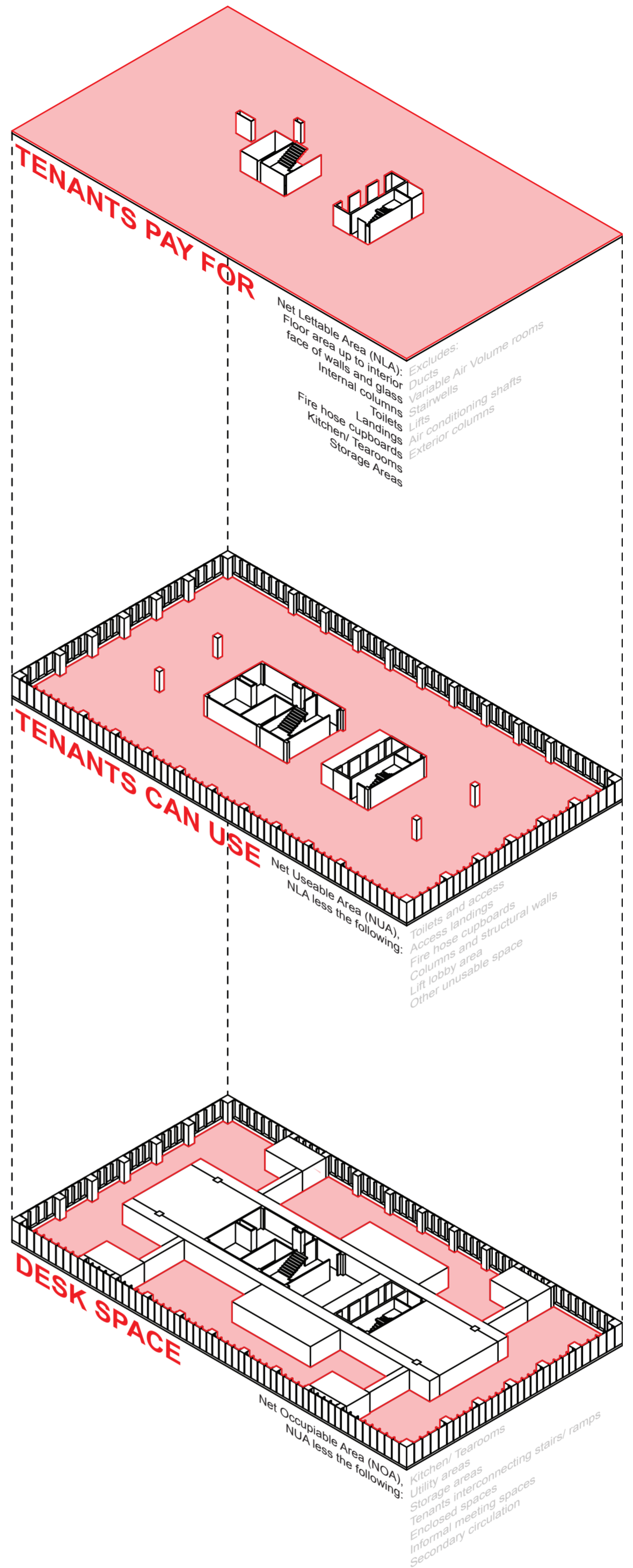
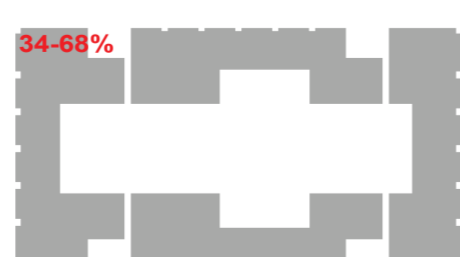
Net Lettable Area (NLA) is what tenants pay for. NLA per person/ desk is the current standard for measuring workplace density.



Net Useable Area (NUA) is what tenants can use for their office interior design (generally referred to as a fit-out) and is not fit-out specific but reflects the space effectively made available to the tenant.



Net Occupiable Area (NOA) is the space available for workstations and reflects the way a tenant is using the space. A dense NOA figure isn't necessarily a bad thing, because it may reflect the addition of quiet rooms or other spaces that positively support the workstation areas.



CONCLUSION

By proposing our own definition we gained insight into 'truer' density measurements, enabling us to collect, standardise and compare survey data. Research within the existing literature showed a lack of sophistication in the way density was measured, so we propose Net Occupiable Area (NOA) as a new definition of density. A denser Net Occupiable Area value doesn't represent a worse space, instead perhaps reflecting spaces that have shared program, such as collaborative areas, that give benefits beyond desk space. This method offers a way to analyse the actual desk space in terms of the immediate density rather than across the whole floor as we believe that Net Lettable Area (NLA) and Net Usable Area (NUA) don't give an accurate impression of the possible density of desks. Our analysis showed that there was a 34-68% difference in usable desk space across the case study premises using an NOA measurement.

The survey data returned unusual results across all variables by showing a neutral, rather than negative, trend as density increased. The implication this gives is that density, within the work environment, appears to make no difference to worker productivity at all. This could have a huge impact on the way office layouts are planned in terms of maximising worker satisfaction and increasing productivity.

In order to fully validate both conclusions a more comprehensive study should be undertaken that more thoroughly examines any additional influences each work environment may have had, such as corporate approach to improving work environment. A larger sample of case study premises would ensure that any inaccuracies due to small sample size would be eliminated and will be essential for further research in this area.

Acknowledgement must be given to Adrian Leaman for use of the Building Use Studies survey he developed and kindly lent us under a research license. Additional thanks goes to the five case study premises who agreed to be surveyed. Note any diagrams used within are indicative only, and represent a general floor plan.