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# A Right Not to Be Mapped? Augmented Reality, Real Property, and Zoning

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**Abstract:** The digital mapping applications underlying augmented reality have strong public benefits but can also have unappreciated effects on real property. In recent litigation on Pokémon Go, an enhanced digital mapping application in which players participate in a digital scavenger hunt by visiting real world locations, homeowners alleged that the augmented reality application harmed their residential properties by increasing the number of people in their residential areas. However, neither the existing laws on intellectual property nor those for real property are designed to address these types of harms. On the one hand, real property torts, such as nuisance and trespass, on which the homeowners relied, are ill-suited to address harms from a digital application as they are based on a right to exclude and consent. On the other hand, intellectual property laws have not focused on harms that could result from the intersection of intellectual property rights and real property. If it were to be framed anew, the basis of the homeowners' claims would be most analogous to asserting "a right not to be mapped." However, there is not yet a "right not to be mapped" in law, and there are compelling reasons for the law not to create one. We recommend three alternative mechanisms to regulate the relationship between augmented reality and real property. We recommend the application of zoning principles as a legal mechanism designed for location-sensitive regulation, which can balance the concerns of individual real property owners, as well as the larger context of community and city interests, and be adapted to innovative technologies such as augmented reality. Additionally, we suggest that catalogues of augmented reality applications be created to support zoning decisions and to provide public notice. We also consider the possibility of licensing schemes with micropayments for real properties affected by augmented reality.

**Keywords:** augmented reality; intellectual property; real property; zoning

## 1. Introduction

James Boyle cautioned in 2003 with respect to intellectual property that "We are in the middle of a second enclosure movement." Under the first enclosure movement, common land—real property—was fenced off into private land. Under the second enclosure movement, it is intellectual property rights fencing off what had been common property.<sup>1</sup>

It sounds grandiloquent to call it "the enclosure of the intangible commons of the mind," but in a very real sense that is just what it is. True, the new state-created property rights may be "intellectual" rather than "real," but once again things that were formerly thought of as either common property or uncommodifiable are being covered with new, or newly extended, property rights.

<sup>1</sup> Boyle (2003) at 37. For a discussion of the rich literature on the public domain, see (Samuelson 2006).

In the second enclosure movement, the concerns have been about walling off intellectual property thereby limiting access to knowledge, and misuse of intellectual property rights thereby restricting rights and access to tangible personal property.<sup>2</sup>

With the advent of augmented reality, we are now facing what might be dubbed a third enclosure movement: where intellectual property affects real property.<sup>3</sup> A paradigmatic example is the litigation claims brought by homeowners alleging that the augmented reality game Pokémon Go caused damage to their residential properties and neighborhoods. Given that their alleged injuries relate to harms about real property, the court claims not surprisingly have been framed in the real property torts of trespass and nuisance. However, these torts are ill-suited to address the effects of a digital technology such as augmented reality on real property. The legal issue put forward by the real property owners more accurately might be characterized as a dispute about whether there is a right not to be mapped. The law, however, does not recognize a right not to be mapped, nor should it. While there may be specific privacy- and security-related reasons to exclude discrete properties such as women's shelters or critical infrastructure from mainstream digital maps, in general the public interest supports comprehensive and accurate spatial data. Including a "right to opt out from mapping" in the bundle of rights held by a landowner would undermine much of the public value in digital mapping.

However, *how* these digital maps are used in an augmented reality application may be regulated. Augmented reality and other applications that use digital maps can have an effect on the character of a neighborhood by significantly increasing vehicular or pedestrian traffic or noise levels. Not every change in a neighborhood associated with augmented reality (or other digital technology) could, or should be, redressed. Over-regulation could stifle the innovative benefits of the technology and undermine the public value in information services such as digital maps. We argue that rather than real property torts, municipal zoning is a preferable mechanism for making these locally based and neighborhood decisions affecting property. Similar zoning principles as to those that are weighed when regulating the effects of tangibles on real property could apply to regulate the effects of augmented reality on real property, enabling policymakers at the municipal level to balance these concerns. The public benefits of digital maps may still lean in favor of a light regulatory hand for zoning; yet, there are cognizable effects on real properties that are not adequately addressed by the existing real property tort framework and are best suited to a regulatory framework akin to municipal zoning.

Augmented reality, and other digital technologies that affect real property, raise many legal issues in relation to the display of information (such as obscenity, defamation, intellectual property including trademarks, political advertising, and commercial advertising) (See, for example, [Tech Policy Lab 2015](#)). Zoning is a well-established legal framework designed for location-sensitive regulation; as such, zoning is well adapted to regulate augmented reality's effects on real property. Some aspects of municipal zoning—such as the rules for political advertising and commercial signs—may already apply or could easily be adapted to augmented reality. For other areas, the digital technology of augmented reality may present special characteristics requiring new zoning rules, such as to address new technological capacities to circumvent zoning and new technological means to aggregate augmented reality applications. In addition to zoning as a legal mechanism to regulate augmented reality's effects on real property, we also recommend that digital catalogues of augmented reality applications be created to provide notice to property owners and to help regulators weigh zoning decisions. Finally, we suggest licensing schemes as a possible form of compensation through micropayments to affected property owners.

In the following parts, we address whether and how the law should regulate augmented reality directly, explain the best categorization of the technology for legal purposes, and based on that categorization recommend three suggested modes of regulation. Part II explains augmented reality

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<sup>2</sup> The Supreme Court of Canada discusses the conflict between intellectual property and personal property in *Théberge v Galerie d'Art du Petit Champlain Inc.*, 2002 SCC 34, [2002] 2 SCR 336.

<sup>3</sup> On metaphors coming full circle from the physical, to the intangible, and back again, see ([Scassa et al. 2011](#)).

and its effect on real properties by analyzing the filings of the Pokémon Go litigation. That case may be seen as a paradigmatic example of the tensions that arise between real property owners and the developers of augmented reality applications, and their divergent perspectives shaped on the one hand by real property as a depletable resource and on the other hand by intellectual property as a value-added and non-rivalrous intangible. We explain why the real property torts of trespass and nuisance, in which that case was based, are a poor fit to regulate the multiple interests, given their focus on the right to exclude and consent. In Part III, we describe how the real property owners' claims are more accurately characterized as a right not to be mapped, a right which has not been recognized yet in law and which we argue should not be recognized. We describe how augmented reality relies on processes of GPS and mapping that have a public interest value, explain the public interest in mapping as a public resource, and why a right to opt out or be excluded should not generally be recognized as part of the real property owner's bundle of rights. In Part IV, we argue that although real property torts and a right not to be mapped are not suitable regulatory mechanisms, there are harms that could arise from augmented reality applications. Accordingly, we argue that zoning is better designed to balance the concerns of individual real property owners, as well as the larger context of community and city interests, and may be adapted for innovative technologies such as augmented reality. In Part V, we provide insight into numerous public interest issues that augmented reality raises and possibilities for regulation. We recommend and describe three regulatory options for augmented reality which, thoughtfully deployed, would address its potential to affect property and people within the city and support innovation: a legal mechanism of zoning, a technological mechanism of a digital catalogue, and a market mechanism of licensing.

## 2. Augmented Reality and Augmented Properties

Augmented reality "allows the perception of the physical world to be enhanced or modified by computer-generated stimuli perceived with the aid of special equipment";<sup>4</sup> typically such devices include cameras on mobile devices (See generally [Wassom 2015](#)). With augmented reality, digital content appears superimposed on the real world as captured and displayed through the camera lens. Augmented reality is used in a variety of sectors, including real estate, marketing, and architecture, and the range and penetration of applications is predicted to increase over time.<sup>5</sup> The most well-known iteration to date is the gaming application Pokémon Go, which achieved widespread popularity and media prominence in the summer of 2016.

Pokémon Go is a mobile gaming application that uses augmented reality technology for a digital scavenger hunt where both the gaming characters and the background are responsive to the player's real-world positioning. Through the app, the Pokémon content, consisting of hundreds of creatures, is depicted in an augmented content overlay on the player's physical landscape and appears dynamically in real time on the player's mobile device screen when the Pokémon Go app is open. The content may appear overlaid on the view of the real world as perceived from the camera lens or can be represented on top of a digital map. Any elements of the physical world the player passes by that are referenced on the digital map used by the application become part of the game. Hence, the houses, office buildings, monuments, waterways, sidewalks, streets, parks, and schools marked on the map become part of the game board. While some commercial property owners were eager to exploit the opportunity to have their properties featured through revenue sharing opportunities, some residential owners by contrast were dismayed by the prospect of an influx of visitors to a neighborhood and the increase in traffic, crowds, and noise.

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<sup>4</sup> *The Oxford English Dictionary*, online, *sub verbo* "Augmented reality, n."

<sup>5</sup> See for example reports that the major technology companies such as Samsung, Google, and Microsoft have all made substantial investment in their augmented reality activities. See ([Palladino 2018](#)).

Several suits were filed against the game developers by homeowners in residential neighborhoods in the United States and Canada objecting to the placement of Pokémon Go game features around their private properties.<sup>6</sup> Significantly, these Pokémon Go cases did not raise the typical intellectual property rights issues associated with the second enclosure: there are no claims about conflicts between intellectual property rights owners, the balancing of owner and user rights for intellectual property, allegations of infringement of intellectual property rights, or overlapping intellectual property rights. Nor do the cases argue that intellectual property is interfering with personal property rights. Instead, the case filings argue the novel claim that augmented reality causes legally cognizable harms to *real* property. Although the consolidated litigation has been dismissed, the language of the filings is emblematic of the perceived tensions between real property and intellectual property rights, and the actual tensions between digital technologies and real properties, which may arise from augmented reality applications. The intersection between these digital technologies and real properties—the third enclosure—raises new legal issues, which the real property torts of trespass and nuisance are not well suited to address.

The lawsuits tried to address the implications for the property owners of their real properties being included in an augmented reality application without the property owner's consent. The parties were contesting who has entitlement to the unclaimed (or at least uncategorized) right arising from augmented reality and whether that right is real or virtual. The homeowners described the augmented reality application as entailing a new virtual space that is part of the real property owner's bundle of sticks; conversely, the augmented reality developer described it as an emerging form of technology that is part of the intellectual property rights.

However, the parties were constrained by the cause of action, in which the plaintiffs based their claims in the real property torts of trespass and nuisance.<sup>7</sup> Both torts are concerned with interference with real property or land; whereas trespass requires a physical intrusion within the boundaries of a real property, nuisance requires a substantial interference with the enjoyment or use of land.<sup>8</sup> On trespass, the plaintiffs argued, “the creation and placement of virtual objects onto real-world private property, especially if those virtual objects create incentives for real property to be in close proximity to them, should be considered as trespass because it violates a property owner's right of exclusive possession and undermines the practical right to exclude trespassers.”<sup>9</sup> They relied on the *Restatement (Second) of Torts*, in which trespass includes when a person “intentionally...enters land in the possession of the other, or causes a thing or a third person to do so.”<sup>10</sup> In its initial filings, the defendant company Niantic sought to have the claim dismissed, arguing that the claim to trespass must fail because there is no authority holding that trespass can arise from a virtual rather than tangible object.<sup>11</sup> Niantic also

<sup>6</sup> *In re Pokémon Go Nuisance Litigation*, Case No 3:16-cv-04300 (ND Cal, 23 September 2016), 2016 WL 6126786 [*Re Pokémon Go*] consolidate three actions from California, Michigan, and Florida. In Canada, a claim was filed in Alberta: *Schaeffer et al. v. Niantic Inc.*, Court file number 1601-01491 (Ct QB AB), 10 August 2016. The Alberta Court filings are far briefer than the US equivalents, and contain no details as to whether the property law claims extend to the game infrastructure nor whether the contents are an intrusion on property rights. The plaintiff in the Alberta case dropped the action after Niantic removed the plaintiff's home as a Pokéstop. See (Graveland 2018). The class action suits in the US were consolidated into one representative suit, *Re Pokémon Go Nuisance Litigation*, seeking to certify a class consisting of private property owners across the US. The proposed class was based on persons nationwide “who own property (i) the GPS coordinates of which were designated by Defendants, without authorization, as Pokéstops or Pokémon gyms in the Pokémon Go mobile application or (ii) abutting property the GPS coordinates of which were designated by Defendants, without authorization, as Pokéstops or Pokémon gyms in the Pokémon Go mobile applications.” (para. 42). As of July 2017, the parties were ordered to re-file in the US case.

<sup>7</sup> *Re Pokémon Go*, Plaintiffs' Opposition to Niantic's Motion to Dismiss, Case No. 3:16-cv-04300-JD, p. 5. The plaintiffs originally also included allegations of unjust enrichment in their filing. This part of the claim was dropped. See Plaintiffs' Opposition to Niantic's Motion to Dismiss, at p. 5.

<sup>8</sup> See *Calandra v. Parasco*, 1998 CarswellOnt 4406, [1998] O.J. No. 4716 (Ont. Gen. Div.) at pp. 5–6, referencing (Linden 1997; Klar 2012, p. 759; Linden and Feldthausen 2011, p. 578).

<sup>9</sup> *Re Pokémon Go*, Plaintiffs' Opposition to Niantic's Motion to Dismiss, Case No. 3:16-cv-04300-JD, p. 20.

<sup>10</sup> *Re Pokémon Go*, Plaintiffs' Opposition to Niantic's Motion to Dismiss, Case No. 3:16-cv-04300-JD, p. 18.

<sup>11</sup> *Re Pokémon Go*, Defendant Niantic, Inc.'s Reply Memorandum in Support of Motion to Dismiss Consolidated Class Action Complaint, at p. 2.

denied liability for alleged third-party-created nuisance by the players, arguing that the terms of use specifically prohibit players from misconduct such as unauthorized entry onto private land.

The real property torts of trespass and nuisance address the property right to exclude. While it is an established real property right to control physical intrusions and nuisance, it is less clear whether the real property right covers harms arising from real property being indexed in a digital map or included in an augmented reality application. In the Pokémon Go litigation, the disagreement was whether the right to exclude encompasses the virtual space and if geolocation referencing of real property is the exclusive purview of the real property owner. Plaintiffs argued they have a right to exclude, and a right to refuse, the placement of virtual content on their real property by other people;<sup>12</sup> the defendants argued virtual content cannot constitute an “unauthorized entry” on land.<sup>13</sup>

Although both parties recognize that augmented reality blends the real and the virtual, in their respective filings the parties disproportionately emphasize one side of that combination and correspondingly downplay the impact or influence of the other. The real property owners see augmented property through the lens of real property being a rivalrous depletable system, where each of the property rights in the bundle of sticks must be named and allocated. As the augmented reality application depends on the existence of the actual place, it is another stick in the real property system. On the other hand, technology companies see augmented property as part of the augmented reality application. They see that as something they created that did not exist before, characterizing it in the fashion of an intellectual property right that is non-rivalrous and non-exclusive. From the technology company’s perspective, the augmented reality application is a value-added technology that enhances existing properties and is separate from them. The real property owners emphasize physicality and tangibility of the effects of the augmented reality application, while the defendants emphasize the virtuality and intangibility of the operation of the application.

Where plaintiffs see their properties being used as a game board, the defendant sees their properties more similar to a painted backdrop, more simulacra than reality. Thus, the plaintiffs focus on physicality by continually referring to activities happening “in” and “on” property and of activities and threats that “materialized,” while the defendant disputes that physicality by emphasizing the software. For the plaintiffs, the defendant’s failure to account for the specific features of their property within the game has the impact of “offloading the costs associated with the physical presence . . . onto the owners of those properties and/or their neighbors.”<sup>14</sup> According to the plaintiffs’ characterization, the virtual is minimized: the defendant “placed” Pokéstops and Gyms “on or directly adjacent to private property.” The plaintiffs emphasize the physical and real in noting the presence of so many Pokémon Go players,<sup>15</sup> the constant traffic,<sup>16</sup> people “stepping onto private property,”<sup>17</sup> “blocking driveways, parking on the wrong side of the street, sitting in driveways,”<sup>18</sup> and “trampling their landscaping.”<sup>19</sup> The plaintiffs complain about people “peering into their windows” or simply hanging around in the street and looking at their homes.<sup>20</sup> The plaintiffs also emphasize the physical by describing the application as “placing” Pokémon and other “virtual objects” on private property,<sup>21</sup> which, they argue, has “effectively usurped private property to use as a game board.”<sup>22</sup> According to

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<sup>12</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, Case No. 3:16-cv-04300-JD, pp. 18–19.

<sup>13</sup> *Re Pokémon Go*, Niantic’s Motion to Dismiss, p. 13.

<sup>14</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, p. 7.

<sup>15</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, pp. 7–8 (“throgs of Pokemon Go players”).

<sup>16</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, p. 10.

<sup>17</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, p. 11.

<sup>18</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, p. 10.

<sup>19</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, p. 8.

<sup>20</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, pp. 8 and 10.

<sup>21</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, pp. 13–14.

<sup>22</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, p. 16.

the plaintiffs' characterization, the defendant "placed" Pokéstops and Gyms "on or directly adjacent to private property,"<sup>23</sup> thus minimizing the "virtual" aspect of the defendant's activities.

This is contrasted with the defendant's argument, which emphasizes the virtual and intangible nature of the augmented reality application by objecting that the plaintiffs "contort real property torts."<sup>24</sup> The defendants emphasize that there is no unauthorized entry, no "tangible object," no "physical intrusion," and virtual items cannot be "placed" on real property.<sup>25</sup> The defendant company emphasizes the traditional elements of trespass and nuisance, which have been based on real-world intrusions and effects. Hence, they argue that virtual items cannot have been "placed" on real property, and without a tangible object on real property, there can be no unauthorized entry for purposes of trespass.<sup>26</sup> Instead of the plaintiff's focus on the effects on real property, the defendant emphasizes the Pokémon Go application and the relationship that exists between the player and their devices, differentiated from the real property. For the defendant, the relationship exists only on screen: the "map shows" their content near real world locations. "Pokémon, Pokéstops, and Gyms exist only on players' mobile phone screens."<sup>27</sup> Thus, the defendants stress that the game is played through "simple on-screen" gestures, players can "obtain helpful in-game supplies," and any "invasion" is only a virtual one.<sup>28</sup> These actions occur "at virtual locations" that simply "correspond to being near the property owners' properties."<sup>29</sup> That the virtual items are visible in the app on private property does not indicate knowledge or trespass, according to the defendants, because people could be playing on their own properties, as invited visitors, or in "myriad public locations."<sup>30</sup> Despite the virtual game pieces appearing on mobile device screens when the players are physically near the real property, the defendant argues it "could not control the real world movement of its users."<sup>31</sup>

Framed around real property rights, the parties' questions focus on entitlement, the right to exclude, and consent: who is entitled to the unclaimed rights arising from the conjunction of real and virtual property through augmented reality technology? That is, to whom does the added value of augmented property flow: to the real property owners as a right to exclude or to the game developers as an intangible? Is the added value more closely aligned to the depletable and finite resource of land or to the non-rivalrous and non-exclusive characteristics of intellectual property?

Core to the plaintiffs' argument is that Niantic put the content on or near their property "without obtaining [the property owners'] consent."<sup>32</sup> As an affected homeowner quoted in the filings remarked about the importance of consent, "it is a little odd that he has no control over his home being a significant part of the game, and never signed off on being included."<sup>33</sup> The plaintiffs' argument assumes that virtual georeferencing should be in the control of the plaintiffs as part of the bundle of rights accorded to real property owners. According to the plaintiffs' reasoning, if virtual placement is part of the bundle for the real property owners, they could exclude the software companies from occupying this virtual space. The plaintiffs assume that if they have a right to exclude, the plaintiffs would need to consent to becoming part of an augmented reality application. Correlatively, as property owners have the ability to benefit economically by being compensated for their consent, the plaintiffs could profit if they choose to consent to the placement of digital content at their property, for example through licensing. Thus, the plaintiffs argue that after having "placed" Pokémon and other virtual

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<sup>23</sup> *Re Pokémon Go*, Plaintiffs' Opposition to Niantic's Motion to Dismiss, p. 7.

<sup>24</sup> *Re Pokémon Go*, Niantic's Motion to Dismiss, p. 8.

<sup>25</sup> *Re Pokémon Go*, Niantic's Motion to Dismiss, pp. 9 and 4.

<sup>26</sup> *Re Pokémon Go*, Niantic's Motion to Dismiss, p. 9.

<sup>27</sup> *Re Pokémon Go*, Niantic's Motion to Dismiss, p. 10.

<sup>28</sup> *Re Pokémon Go*, Niantic's Motion to Dismiss, pp. 8 and 14.

<sup>29</sup> *Re Pokémon Go*, Niantic's Motion to Dismiss, p. 3.

<sup>30</sup> *Re Pokémon Go*, Niantic's Motion to Dismiss, pp. 16–17; *Re Pokémon Go*, Defendant Niantic, Inc.'s Reply Memorandum in Support of Motion to Dismiss Consolidated Class Action Complaint, p. 4.

<sup>31</sup> *Re Pokémon Go*, Niantic's Motion to Dismiss, p. 21.

<sup>32</sup> *Re Pokémon Go*, Plaintiffs' Opposition to Niantic's Motion to Dismiss, p. 7.

<sup>33</sup> *Re Pokémon Go*, Plaintiffs' Opposition to Niantic's Motion to Dismiss, p. 11.



objects on private property “without seeking permission,” the defendants “inherently encouraged and rewarded players for traveling to those objects whether they were on private property or not.”<sup>34</sup>

The plaintiffs’ memo emphasizes the non-consensual and unauthorized use by the defendant of the plaintiff’s property. The plaintiffs argue Niantic is the proximate cause of the interference with their use and enjoyment of their property by placing the game content on the GPS coordinates of their properties, resulting in an increased number of people who are gaming. However, it is important to emphasize that asserting a property owner’s “right to exclude” does not precisely answer “exclude what”? The right to exclude gives the owner the ability to control who and what physically enters the property and to control non-interference with the enjoyment of the land. But, does that mean, for example, that the property owner also has the right to control whether virtual content appears with their property on a mobile device screen when the app is open, whether the real property may be pictured in a database, and whether the property’s coordinates may be a reference point in a database? More broadly, is there a right not to be part of an augmented reality application, and more broadly still, is there a right not to be mapped?

Bound to the property-focused causes of action in trespass and nuisance, the case, as framed, cannot fully explore this normative range. The challenge for developing an appropriate legal response is that augmented reality blends the real with the virtual. The intersection between digital spaces and real properties creates “augmented properties,” defined as those real properties augmented by digital applications and georeferenced in an augmented reality application (Judge and Brown 2017, p. 989):<sup>35</sup>

The term *augmented property* may be used to refer to this combination of real and virtual property in the application. Augmented properties are those properties where real property and its surrounding space are augmented by virtual features by being referenced in an augmented reality application. Augmented property comprises the real property that is georeferenced in an augmented reality application, and the virtual property that uses real property as georeferenced coordinates to enable location-based activities.

These augmented properties raise new legal questions that are better addressed by zoning than by real property law’s focus on the right to exclude.

### 3. A Right Not to Be Mapped?

A sophisticated reading of the property owners’ claims in the Pokémon Go litigation shows that they are claims about the permissible uses of mapped information. In the original case filings, Marder, the plaintiff from New Jersey, complained that his house GPS coordinates were incorrectly included in the database and in later filings the joined plaintiffs state that “landowners should have the right to refuse the placement of virtual objects on their property.”<sup>36</sup> This interpretation is consistent with the design of the augmented reality applications that interact with real properties, which rely on digital maps. For example, initial investigations into the map foundations of the Pokémon Go game indicated that the game most likely relied on Google Maps as its base map (Meyer 2016; Lankinen 2016). More recently, it has been confirmed that the creators of Pokémon Go changed their base map to “Open Street Map,” an open and crowdsourced mapping software (Singh 2017). For such augmented reality applications, in-game content is created with reference to the GPS coordinates contained in the map. For Pokémon Go, the creators were able to import game content that they had already created in an earlier augmented reality game (Bogle 2016). The in-game content is tracked and displayed in the game using GPS coordinates for permanent content. These are most often the GPS coordinates of places of significance, such as waterways, monuments, or parks. In addition, in-game content appears

<sup>34</sup> *Re Pokémon Go*, Plaintiffs’ Opposition to Niantic’s Motion to Dismiss, p. 14.

<sup>35</sup> Augmented properties are “defined as the aggregate of real and virtual that occurs when real property is included as coordinates in an augmented reality application.” (Judge and Brown 2017, p. 975.)

<sup>36</sup> *Re Pokémon Go*, Plaintiff’s Opposition to Defendant’s Motion to Dismiss, p. 15.

in relation to the movement of the player. The game interacts with place by tracking user movement and inserting game pieces into the game in relation to where the user is on the map. The introduction of Open Street Map as the base map will serve to make the Pokémon Go game even more interactive and user focused as active contributors to the open source map base layer have the opportunity to add information about their neighborhood to the map. The result of this is a “dynamic and detailed” and “increasingly information-intensive and interactive” map (Blitz 2012, p. 128), which in the case of Pokémon Go is used for gaming purposes, but applied generally to augmented reality could serve a variety of purposes. Blitz argues that digital maps such as those used in augmented reality are essentially an “extension of our perception.” (Blitz 2012, p. 129).

Yet, a right for one’s property *not* to be mapped (or a right to exclude one’s property from a mapping application) has not yet been recognized in law and would be bad policy. From a policy perspective, there are numerous public benefits to digital maps. Augmented reality games, such as Pokémon Go, that rely on digital maps are merely one example of locational applications providing a range of services, such as to help people find friends, schools, parking places, or pick-up basketball games. These benefits could potentially be jeopardized by real property rights, on the one hand, and intellectual property rights, on the other hand.

First, the public benefits of a digital map lie in their comprehensiveness and accuracy of the locational data that is being referenced. This trait could be jeopardized if real property rights are read broadly to include a new right not to be mapped. If property owners could choose that their properties *not* be referenced in the map, or if entire neighborhoods could choose not to be referenced in a map (for example, through an opt-out mechanism, which is akin to the plaintiffs’ position in the Pokémon Go litigation), it would undermine the efficiency and utility of digital maps and applications.

Second, the public benefits of a digital map also rely in their being publicly accessible. This trait could be jeopardized if intellectual property rights are used to lock up digital maps through technological protection measures or exclusionary subscription models. To Niantic’s credit, Pokémon Go is a free download using the open source Open Street Map. Other intellectual property rights owners, however, could choose a revenue model with a high subscription cost or restrictive licensing, or adopt an advertised-based revenue model that sells people’s personal information as the price of “free” access.

As Niantic highlighted in its filings in the Pokémon Go litigation, the plaintiffs’ claims to mapped information if successful could put a serious limitation on the creation and use of any number of applications that have locational implications. While the most familiar digital maps are created on a large scale by corporate entities such as Google, a variety of smaller neighborhood or community interactive digital maps could be created using cell-phones and GPS equipment and crowdsourced through Open Street Map and could also be at risk if there were a right to exclude a real property from a map (Blitz 2012, p. 129). Niantic raised the specter that if augmented reality is regulated, any beneficial app using location services or even identifying specific places could be at risk since they too “could be said to play a role in irresponsible third party creating nuisance.”<sup>37</sup> To this end, the defendants aligned the game with other locationally responsive applications that have been comparatively free of controversy and generally accorded to be “socially beneficial,” despite having a similar potential impact on neighborhoods by drawing people in to an area. Hence, the defendant emphasized popular location-based applications for identifying birds, finding driving short cuts, selecting “top parks for children,” and showing the last sale price for real estate.<sup>38</sup> Further examples by Niantic are any “walking tour app that flags landmarks or an app that permits users to ‘check-in’ virtually to a location to connect with friends.”<sup>39</sup> These applications, Niantic pointed out, and not only gaming applications, would be “threatened” if the real property torts of nuisance and trespass were used to regulate virtual

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<sup>37</sup> *Re Pokémon Go*, Niantic’s Motion to Dismiss, p. 21.

<sup>38</sup> *Re Pokémon Go*, Niantic’s Motion to Dismiss, pp. 9, 15, 21.

<sup>39</sup> *Re Pokémon Go*, Defendant Niantic, Inc.’s Reply ISO Motion to Dismiss Case No. 3:16-cv-04300-JD, at p. 2.



space, as the “plaintiffs’ theory of liability would implicate innumerable online services that help users find specific locations” and software that helps people “explore the world around them.”<sup>40</sup>

More troubling, if the plaintiffs’ reasoning supports a right to exclude their property from a digital mapping application, the same logic could be extended to support a right not to be mapped at all, whether through digital applications or paper. From the real property owner’s perspective, if there were a right not to be mapped, it would be difficult to differentiate being indexed in an augmented reality application that uses a digital map from being indexed on a paper map; in both cases, the right, if it existed, would seem to apply. In his commentary on the issue, Brian Wassom observes that limitations on augmented reality applications could have an impact on a broad range of interactive maps, beyond the digital context, even including situations where people are using *analogue* maps to complete a scavenger hunt.<sup>41</sup>

Despite the long history of maps and ample opportunity for courts to have addressed it, a “right not to be mapped” has not been included as part of the bundle of rights for real property owners. The historical policy that has been developed in the analogue context remains compelling for the digital context as well. The *absence* in the law to date of an explicit right not to be mapped as a right controlled by the real property owner is instructive for how best to set policy for digital technologies that rely on maps.

The United States decision, *Boring v. Google*,<sup>42</sup> is the closest example of a case concerning what could at the outermost limits be understood as claims amounting to a right not to be mapped. In that case, Google entered the Borings’ property to photograph it for inclusion in “Street View,” which is part of the Google Maps database. The Borings’ property was set back from the road, 1000 feet from mailboxes and the public road, and their private laneway was marked with no trespass signs. The Borings made a claim in tort for both invasion of privacy and trespass. The court dismissed the claim to invasion of privacy, as they found Google’s actions did not amount to the standard of being “substantial and highly offensive to a reasonable person,” observing that “no reasonable person would have been offended as a result of a car entering his driveway and photographing his house.” However, the court did find Google liable for what was a clear case of trespass given Google’s physical entry on the property, and Google paid nominal damages of \$1. That case, however, did not impose liability for the mere act of geolocation or for the activity of including a property on a map.

Efforts to recognize interests related to a right not to be mapped have been most successful when framed as protecting individuals on a theory of privacy rights, rather than protecting the location of the real property per se. At the launch of the now ubiquitous Google Street View, there was much discussion among privacy commissioners and lawmakers whether the activities of Google’s activities of collecting data and photographing street views was a breach of statutory requirements to safeguard people’s personal information.<sup>43</sup> Google Street View and similar street imaging services<sup>44</sup> raised serious privacy concerns because they could capture personal locational information. By matching person and place, potentially sensitive information could be inferred as to people’s work, health, recreation, family, and sexual activities. Privacy concerns about Google’s Street View activities were exacerbated when

<sup>40</sup> *Re Pokémon Go*, Niantic’s Motion to Dismiss, pp. 9–10.

<sup>41</sup> Brian Wassom, “Milwaukee, Pokémon Go, and the First Amendment: *Is the City’s New Ordinance a Step Too Far?*” (7 December 2016).

<sup>42</sup> *Boring v. Google*, 362 F. App’x 273, 281 (3d Cir. 2010). From the plaintiffs’ website: “Judgment Against Google: Google concedes liability relinquishing their absurd defense that they ‘have an implied license by general custom’ to enter land. With Google finally conceding all liability for trespass, on the record, Plaintiffs are finally vindicated. Google is adjudicated as an intentional trespasser. Case closed.” (TEV Law Group 2010).

<sup>43</sup> *Personal Information Protection and Electronic Documents Act*, S.C. 2000, c. 5.

<sup>44</sup> A contemporaneous example to Google Street View was the activities of the “Canpages” project from Yellow Pages Group, who were launching a city-focused imaging service at the time (House of Commons Canada 2011). Interestingly, Canpages launched a free augmented reality application for use with Canpages called Canada Eye. The House of Commons report does not distinguish between the privacy implications of an augmented reality application compared to a digital mapping service such as Google Street View. See p. 10.

it was revealed that Google's vehicles were capturing vast amounts of data by accessing Wi-Fi spots as they passed by properties (Office of the Privacy Commissioner of Canada 2010a). Data accessed included e-mails, e-mail addresses, usernames and passwords, names, and residential telephone numbers. Google stopped the practice of collecting personal data through Wi-Fi (Office of the Privacy Commissioner of Canada 2010b) and implemented processes to manage personal information in the Google mapping database, such as blurring out car license plates and people's faces (on request) (House of Commons Canada 2011, pp. 12–13). These measures treated location as information about a person, rather than as an aspect of a real property right.

Locational privacy concerns are addressed in existing privacy legislation. For example, according to the Office of the Privacy Commissioner, the Canadian federal private sector privacy statute, *Personal Information Protection and Electronic Documents Act* (PIPEDA), prevents “commercial collection and use of personal information through street-level imaging technology” that is captured without the apparent knowledge or consent of the individuals who appeared in the images (Denham 2009, at 0900). The guiding principles for PIPEDA are to ensure knowledge, consent, safeguards, and limited retention of the personal information that is collected. Within this framework, privacy claims are based on whether there is personally identifiable information, such as where individuals are visible on a street (Office of the Privacy Commissioner of Canada 2009). The importance of privacy protections for personal information may be heightened when the personal information is collected in sensitive locations, such as shelters<sup>45</sup> or abortion clinics<sup>46</sup>.

*Streisand v Adelman*,<sup>47</sup> in which Barbara Streisand claimed a right to privacy in the location of her home against the creator of the “California Coastal Records Project,” is indicative of the distinction between claims to privacy of a person in a place, as compared to claims of privacy in a place. The project collected aerial photographs of almost the entire coastline of California, which were made available to the public for free.<sup>48</sup> The court observed that the resulting photograph was identified as Streisand's property in the company's database, and in turn a knowledgeable individual could use the longitude and latitude coordinates to locate the property; however, there were no identifiable people contained in the photograph. Streisand was unsuccessful in the action. The court concluded that the mapping project was built on publicly accessible records such as parcel records, and that creation of the photographed record of the coastline conducted as part of a conservation project related to a “matter of great public interest”<sup>49</sup> and was an exercise of the defendant's First Amendment Rights. *Streisand v Adelman* suggests that place-based privacy protects the activities that people undertake at those locations, rather than the locations in themselves.

In another recent decision concerning digital mapping, *Rosenberg v. Harwood*,<sup>50</sup> the court observed that there is a “high social utility in the map service provided by Google,”<sup>51</sup> despite the map in that

<sup>45</sup> On this point, see an online petition that called for the removal of the street addresses of women's shelters in digital maps such as Google. The petition is indicative of the problem of sharing detailed information of specific places online. Jeremy Janice, “Remove Maps to Secret Domestic Violence Shelters” (Janice 2015). The online digital map service “MapQuest” responded to this petition and removed images. In another example, involving a complaint about Google revealing the location of shelters in the UK, Google responded that removal of Street View images from its database was a simple process and users simply had to request that sensitive locations be removed (LaCapria 2010).

<sup>46</sup> “In addition to companies being proactive and creative in their public communications to ensure that Canadians know when their cities—and, therefore, they themselves—may be photographed, we think these companies need to be more privacy sensitive in the areas they choose. They need to be mindful that people entering or leaving sensitive locations, such as shelters or abortion clinics, likely want to remain anonymous for privacy and safety reasons.” Office of the Privacy Commissioner of Canada 2009.

<sup>47</sup> *Streisand v. Adelman*, Los Angeles Superior Court, Case No. SC 077 257 (2003). See online: <http://www.californiacoastline.org/streisand/slapp-ruling.pdf>.

<sup>48</sup> *Streisand v. Adelman*, at p. 4.

<sup>49</sup> *Streisand v. Adelman*, at p. 9.

<sup>50</sup> *Rosenberg v. Harwood*, No. 100916536, 2011 WL 3153314 (D. Utah 27 May 2011). The plaintiff relied on Google Maps for directions, which led her to walk down a rural highway that had no sidewalks, and she was subsequently struck by a vehicle.

<sup>51</sup> *Rosenberg v. Harwood*, No. 100916536, 2011 WL 3153314 (D. Utah 27 May 2011). The court's reasoning reflects the early judicial response from the Supreme Court of New York to the surveying work completed by land surveyors wherein the

case lacking enough information for safe pedestrian travel.<sup>52</sup> Recognizing the public good in mapping does not mean that there is an unqualified right to document spaces in public per se (Helft 2007). There are, as noted, privacy implications for individuals as well as security concerns. However, it does signal an underlying policy not to recognize a general right to exclude a property from being mapped within the bundle of rights of a real property owner. Thus far, this policy has largely been reflected in the *absence* of the recognition of an explicit right not to be mapped.

Scholarship and cases have addressed what the rights of the map makers are for intellectual property rights, but not the corollary question of whether the homeowners have a right not to be included in the map as a real property right. Focusing on the limits of the map-makers' right to document public space provides insight into how the law approaches the propertization of elements or points of information that go into a map. The GPS coordinates of longitude and latitude at the heart of every map are public goods and not subject to private propertization. The Pokémon Go game utilizes GPS (Global Positioning System) coordinates to track player movement and situate game content. GPS units, including hand-held units as contained in cellular phones, measure the time it takes for radio signals sent from satellites to travel to earth.<sup>53</sup> GPS utilizes the numerical measures of longitude and latitude, which are essentially numerical world addresses. The GPS system was developed by the United States Air Force as a national asset that was later turned into an open access system with free use for citizens in the late 1990s.<sup>54</sup> GPS, along with other countries' satellite navigation systems such as GLONASS, operated by Russia, and Galileo, operated by the European Union, are part of the Global Navigation Satellite System (GNSS), an internationally available satellite navigation system (Federal Aviation Administration 2015).

As with all raw data, the factual information to create maps, whether digital or analogue, is not copyrightable (Green 2003; Judge and Gervais 2010). Information about road names, property numbers, where roads intersect, and buildings of significance are all considered to be facts. As an Alberta provincial court observed: "Facts exist. In the world of map making, roads exist. Drawing a road on paper to show where that road exists in relation to other roads cannot create a subsisting copyright."<sup>55</sup> Hence, individual addresses and geolocational coordinates are not protectable under copyright.<sup>56</sup> Furthermore, in the context of public figures, addresses may be considered newsworthy for publication.<sup>57</sup> However, there are map-related elements that are copyrightable. An original selection or arrangement of facts is copyrightable as a compilation.<sup>58</sup> Moreover, maps are included in the category of artistic works.<sup>59</sup> Thus, a database of geospatial information, if it is an original

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court avoided ascribing liability for mistakes when acting with reasonable care due to the value of their work. See *Troup v. The Executors of Smith*, 20 Johns 33 (Supreme Court, NY, May Term, 1822).

<sup>52</sup> Notably, in addition to the negligence and duty of care analysis, Google claimed First Amendment rights in the work of the mapped content. The case was decided on the grounds of negligence. The court went so far as finding that Google did not owe a duty of care to the claimant and so was not liable for mistakes in its digital map.

<sup>53</sup> For a full account of the history of GPS see (The National Aeronautics and Space Administration 2012; Powers and Parkinson 2010, pp. 67–86; Milner 2016, pp. 24–45).

<sup>54</sup> Office of Science and Technology Policy National Security Council (1996, p. 1). The policy directive stipulates that "[The US] will continue to provide the GPS Standard Positioning Service for peaceful civil, commercial and scientific use on a continuous, worldwide basis, free of direct user fees."

<sup>55</sup> *R v. Allen*, 2006 ABPC 115 (CanLII), <http://canlii.ca/t/1n27h>, para. 11. At issue in this case was whether a map met the copyright test for an original work, defined as the product of an author's skill and judgement. The Supreme Court of Canada's originality standard is set out in *CCH Canadian Ltd v Law Society of Upper Canada*, 2004 SCC 13, [2004] 1 SCR 339 at paras 15–16, 25. On maps and originality, see Judge and Gervais 2011, pp. 114–15.

<sup>56</sup> There was a missed opportunity in Canada to decide whether postal codes are copyrighted content and if the rights are held by Canada Post, the creator of the postal code database. A copyright infringement lawsuit, *Canada Post v. Geolytica*, was settled in 2016 (Canadian Internet Policy and Public Interest Clinic CIPPIC).

<sup>57</sup> *Christianne Carafano (aka Chase Masterson), an Individual, Plaintiff, v. Metrosplash.com Inc., et al*, 207 F. Supp. 2d 1055 (C.D. Cal., 11 March 2002), affirmed on other grounds, 339 F. 3d 1119, No. 02-55658 (9th Cir., 13 August 2003), finding no liability of an internet provider for invasion of privacy by public disclosure of private facts because the publication of an actress's home address was "newsworthy" and the intrusion "minimal" since the address was a matter of public record.

<sup>58</sup> *Copyright Act*, R.S.C., 1985, c. C-42, s. 2, "compilations" and WTO, *TRIPS Agreement*, 15 April 1994, 1869 UNTS 299, art 10(2). On compilations, see *Robertson v Thomson Corp.*, 2006 SCC 43, [2006] 2 SCR 363.

<sup>59</sup> *Copyright Act*, s. 2, s.v. "artistic works."

selection or arrangement, and a map, if it is an original artistic work, may be protected under copyright. However, neither a whole-of-universe database of geospatial information nor the discrete factual data of a map is protected under copyright. Put another way, property owners would not be able to use copyright to protect the geolocational references for their real property.

Similarly, it is unlikely property owners could prevent digital links to the locations of their real property from being included in an augmented reality application. The digital and interactive maps such as those used in an augmented reality application contain links and references to physical places. These linking capabilities are not unlike a URL or hyperlink for accessing a webpage. According to the Supreme Court of Canada, a hyperlink is in essence a reference.<sup>60</sup> In *Crookes v Newton*, in the context of defamation law, the Supreme Court of Canada ruled that a hyperlink to content is generally not considered a publication of the content referenced by the hyperlink.<sup>61</sup> “Given the core significance of the role of hyperlinking to the Internet,” according to the judgment, extending liability to hyperlinking would “risk impairing its whole functioning.”<sup>62</sup> Although the situation is more complicated for copyright infringement, courts have been similarly reluctant to impose liability on those who innocently link to copyrighted material, again reflecting the judicial concern that activities that are integral to the functioning of the digital environment, like hyperlinking, not be impaired (Ginsburg and Budiardjo 2018, p. 220). Extending this reasoning, courts presumably would also be reluctant to impose liability for the “core significance” of referencing of real property on a digital map, which could likewise “risk impairing” the “whole functioning” of digital mapping. If a coordinate on a map may be considered a “link” to real world property, extrapolating from the principles in the hyperlink cases, the act of digital referencing real property would not constitute an infringement of real or intellectual property rights. Moreover, the points of data constituting the “link” would also not be copyrightable or ownable or excludable under intellectual or real property principles.

Propertizing these points of information would seriously disrupt map-making processes and affect a variety of applications and activities that concern georeferenced information. Attempts to exclude one’s property from an augmented reality application would create significant obstacles to the creation of digital maps and would undermine the utility and accuracy of the resulting digital maps. Taken to the extreme, recognizing the right to opt out of a map as part of the bundle of real property rights could result in any georeferences to the real property of someone who did not consent to be included in a map or who wants to opt out of a map being considered a virtual trespass. Such georeferencing would include the activities of applications such as Google Maps, Four-Square, Snapchat, Waze, and MapQuest, and further raises the possibility that virtually any application that includes location information, even if the application does not georeference the property itself, could be subject to claims of virtual trespass.

The scholarly warnings about the dangers of intellectual property’s second enclosure—restricting access to information—are just as salient for digital maps. Akin to the commons of natural resources, the digital resources also need to be maintained. According to John Palfrey, the digital environment is similar to physical parks (Palfrey 2009):

Digital environments are becoming the most important public spaces of the twenty-first century. These digital spaces are where many young people—and many older people, too—spend enormous amounts of time. These spaces are akin to the public parks, schoolyards, malls, and lecture halls of the physical world.

Just as with public parks, schoolyards, and other city space, digital resources are important spaces for the city and for sites with contending public and private interests. Part IV details how local-level zoning may be used to manage a thoughtful deployment of augmented reality that recognizes the

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<sup>60</sup> *Crookes v. Newton*, 2011 SCC 47, [2011] 3 SCR 269, para. 27.

<sup>61</sup> *Crookes v. Newton*, paras. 42 and 3 per Abella J.

<sup>62</sup> *Crookes v. Newton*, para 36 per Abella J.

potential impacts that the technology may have on communities, with consideration of real property owners' concerns and the innovative promise of the technology.

#### 4. From Real Property Torts to Zoning

While there is no existing right not to be mapped, and compelling reasons not to create one as part of a real property owner's right to exclude, nevertheless, the real property owners' concerns that digital maps and augmented reality can alter neighborhoods and degrade property values should not be dismissed. Critical cartographer J. B. Harley has long recognized the potential for maps to codify systems of power. He argued that maps should be understood as multidisciplinary in nature, representing social and political forces and representations of power, and implored us to "search for the social forces that have structured cartography and to locate the presence of power—and its effects—in all map knowledge." (Harley 2001, pp. 151–152) Relying on mapped content to show a singular correct interpretation of a place ignores the interpretive and subjective element to all cartography, whether digital or analogue. The danger in obfuscating this reality is emphasized by Laura Kurgan (Kurgan 2013, p. 16):

The more they become our everyday means of navigating simple and complex situations alike, the more we take maps for granted. Rather than the interpretations of information that they are, we too often see them simply as representations and descriptions of space. This makes the task of analyzing them even more critical.

The advent of the GPS system has served to create even more instability as it enables a digital map to shift and reorient itself around the user, removing a sense of even the most "fixed parts of the earth." (Kurgan 2013, p. 15; see also Milner 2016) The digital map, coupled with the GPS-enabled focus on the individual user, "omit[s] . . . those invisible lines of people, places, and networks that create the most common spaces we live in today" (Kurgan 2013, pp. 16–17).

Unlike traditional technology processes that take place using the theoretically undepletable resources of intellectual property, augmented reality intersects with the real world and so there is an impact on finite physical resources. The increased burden on lands and properties is evidenced by increased numbers of people congregating in areas in uncommon numbers and with uncommon frequency. The Pokémon Go phenomenon also provides insight into ways in which the use of a property may be altered through augmented reality applications. The plaintiffs listed concerns relating to intrusion in their properties and an increase in the number of people either in the immediate surrounding areas (looking through windows), or seeking permission to enter a property (by ringing a doorbell). As well, the property owners were concerned about their ability to control the types of activities occurring on and around their property, including how many people are standing on the sidewalk, walking across the street, coming onto the roads, or using nearby public resources. Likewise, many formerly less-travelled streets have seen a large increase in cars as a result of crowdsourced routing apps such as Waze, leading to complaints to city council by homeowners in cities such as San Francisco, Los Angeles, and New York (Thornton 2015; Weise 2017). As a *New York Times* article described, "Navigation Apps are Turning Quiet Neighborhoods into Traffic Nightmares" (Forderaro 2017). These concerns are indicative of future problems as augmented reality applications, and other applications that rely on digital maps, are rolled out more broadly.

Augmented reality has increased dramatically in a short time. The 2017 iOS release of an augmented reality toolkit makes augmented reality increasingly accessible for startups and entrepreneurs. With the predicted increase in market size for augmented reality, it is important that the concerns of property owners like those in *Re Pokémon Go* be taken seriously, while also balancing the public interest in these technologies.<sup>63</sup> Pokémon Go was a massively popular phenomenon, and future gaming applications

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<sup>63</sup> 2017 projections are for the augmented reality software market to reach a value of USD \$35 billion by 2022. (Cisions PR Newsletter 2017).



leveraging familiarity and nostalgia could cause similar tensions with residential property owners. Indeed, Niantic is planning to release a “Harry Potter”-themed game built on the same mapping technology infrastructure as Pokémon Go (Niantic 2017). Yet, real property torts are not framed to address these concerns. Focused as they are on individual property owners’ right to exclude and whether individual property owners provide consent, real property law and the torts of trespass and nuisance are not as well suited to managing the neighborhood-level effects of augmented reality on real property. Instead, zoning as a regulatory mechanism is better designed for the complex exercise of balancing the public interest in digital mapping with the effects on individual real property owners, as well as weighing the urban planning impacts that augmented reality has on multiple properties, neighborhoods, broader communities, and the city as a whole.

It is the nature of augmented reality games such as Pokémon Go that they specifically invite people to go to new areas in order to play; likewise, augmented reality applications for property development or property staging require the user to be at the location in order to see the augmented view. That the locations visited by gamers or users of an application are chosen by the creators of the technology exacerbates burdens on lands that may be unprepared to cope with sharp uptakes in people using the resources of a place. When augmented reality applications go viral, these shifts can be sudden as with the Pokémon Go craze in 2016. Further, these effects can touch areas that hold significant historical, traditional, or spiritual value, where there is an enhanced public interest in maintaining the integrity of the site. The Pokémon Go game relied on a historical marker database to identify significant sites for game piece placement; based on that example, sites of historical importance may be accessed more often by users but without the benefit of notice and coordinated efforts to identify and preserve such sites. Further, particular augmented reality applications may be perceived to be discordant with a site’s primary purpose, such as memorial and spiritual sites.<sup>64</sup>

Another concern for the regulation of augmented realities is the type of content that an application could include. The Pokémon Go game is easy to dismiss for its innocuous content of cartoon characters that are captured in a non-lethal fashion by the player.<sup>65</sup> However, an augmented reality application can potentially be used for more provocative content. Concerns have already been raised about the use of augmented reality applications for pornography, and similar concerns could be raised about violent content.<sup>66</sup> Other content that could be problematic includes political advertising, which is currently tightly controlled by municipal by-laws.<sup>67</sup> If augmented reality were interpreted to fit within the bylaws on political advertising, the municipality would have to develop a way to monitor what content is put where and by what augmented reality applications. Other examples of content that could be problematic are competing advertisements and marketing. Currently in Pokémon Go businesses can request to have their property be a permanent game piece,<sup>68</sup> and businesses can pay to have game

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<sup>64</sup> Judge and Brown (2017) (examining widespread criticisms when Pokémon Go players played the game at sites of remembrance, pointing to conflicts between the social value of play and the cultural significance of memorial places in the city).

<sup>65</sup> The extent to which real world content may be included in a digital application has been raised in relation to other technologies. See, for example, the recent case of *Lohan v. Take-Two Interactive Software*, No. 24 (NY Ct App), decided 29 March 2018. Lohan alleged that the defendant creators of the video game “Grand Theft Auto V” had included a character with Lohan’s likeness without her permission. The case was dismissed by the State of New York Court of Appeals, affirming a lower court decision. Although in this case the appeals court found that the avatar was not a full likeness to Lohan, it did concede that an in-game avatar could constitute a portrait and so be subject to a claim of right to privacy according the New York civil rights law sections 50 and 51.

<sup>66</sup> Wassom (2015), chapter 13, “Addiction and Pornography,” pp. 311–31. Wassom, who coined the term “augmented pornography,” warns of the “potential [for] augmented media to reinforce negative and compulsive behaviors.” For Wassom the responsibility for managing the negative impacts of augmented pornography lies with the creators of the content, who could establish upper limits for the user.

<sup>67</sup> For example, in Toronto signage is not allowed on private properties without permission of the property owner, and not on public properties unless they adhere to strict rules, one of which includes making a payment to the city. See City of Toronto, Election Sign Enforcement Toronto Municipal Code, Chapter 693, Signs, Article II Election Signs, “Election signs on public property,” s. 693–97 and “Election signs on private property,” s. 693–98.

<sup>68</sup> Due to high demand, this service for Pokémon Go was suspended: “Please note, we are currently not accepting submissions for new PokéStops or Gyms. If you are having trouble finding PokéStops or Gyms near you, please try visiting a local



content placed at their property, but another application could allow businesses to place content at the locations of third-party real property owners, who may not even be aware that the content exists.<sup>69</sup> This could lead to questions of how to balance market competition and free expression and potentially protectable intellectual property such as trademarks.

In addition to the potential types of content contained in an application, there are questions about the sites where augmented reality content is accessed, as well as which content appears at which locations, which could raise public policy questions. For example, augmented reality pornography could be accessed in areas used by families including schools and parks, in which the app would show pornographic material overlaid on play structures or school buildings. Likewise, advertising could be placed in a specific location with the intention of being provocative, such as for competing businesses or rival sport teams. Picture, for example, augmented reality used to fill a professional sports field with the mascots of opposing teams or for advertising for McDonald's to appear in the application when someone passes Wendy's. Presumably, a business owner would seek to prevent competitors from having augmented reality content (such as game pieces, advertisements, or frequent shopper points) accessible at their property. If information about a business appears in an augmented reality application as one passes a commercial establishment, such as health inspections or customer reviews, is that different from an online Yelp review?

The location in which augmented reality is accessed could also contravene city zoning ordinances. Larger municipalities regulate city areas through the use of zoning, which permit and prevent activities from occurring in designated areas. Examples of regulations relevant to augmented reality are municipal prohibitions on advertising in a residential area. City of Ottawa's By-law 2004-239, for example, concerns temporary signs on private property. Section 5(1) provides that: "No person shall place a temporary sign on any premise zoned residential under any Zoning By-law in effect within the City of Ottawa."<sup>70</sup> Would this by-law pertaining to "a temporary sign" apply to an augmented reality advertisement in a residential area? If an augmented reality application allowed businesses to pay to have commercial billboards appear at people's homes within the game, would existing zoning demarcating residential and commercial spaces apply to prevent that? The introduction of augmented reality raises the possibility of a given application ignoring or circumventing existing municipal zoning regulations that designate certain areas as residential and other areas as commercial or industrial.

Moreover, there may come a time where there are multiple augmented reality applications in the same place (Wassom 2015)<sup>71</sup>. Technological processes such as aggregation could increase the number and likelihood of people accessing augmented reality. An aggregator refers to computer software that gathers specific types of information from multiple online sources to be shared directly with a customer. Aggregators are now a standard information technology feature as they are useful for the management of a high volume of digital sources, particularly for the aggregation of news or social networking content. In the context of augmented reality applications, an aggregator would assist users by collecting information about the locations where the most augmented reality applications can be accessed. Although a standard feature for the management of digital content, aggregation of augmented reality content would have a different impact with respect to real property as it would collect data about augmented reality applications and content, and by inference, information about where in the physical world to go to access content. Aggregator technologies, which collate or curate augmented reality applications, could create high volumes of people and activity in new areas, thereby

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park or other interesting or historical locations in your community." FAQ, "Reporting Pokéstop or Gym Issues." <<https://support.pokemongo.nianticlabs.com/hc/en-us/articles/221968408-Reporting-Pok%C3%A9Stop-or-Gym-Issues>>.

<sup>69</sup> See (Constine 2017; Tassi 2017); see, for example, the partnership deal signed with Sprint and Starbucks (Etherington 2016; Wong 2016).

<sup>70</sup> City of Ottawa, By-law 2004-239, Temporary Signs Private. See also, City of Ottawa, By-law 2003-520, Signs on City Roads, s 2 (prohibiting the placement of "wayfinding" signs on highways).

<sup>71</sup> Wassom also observed that there will be multiple augmented reality applications, but argued that it is likely that there will be a limited number of successful augmented reality applications in an area because of the natural limitations of people.

increasing the burden on land and real properties. Indeed, there may be a tipping point in which a density of augmented reality in particular neighborhoods in itself could attract additional augmented reality content, in the same way that physical stores, such as antique stores, often congregate in particular areas.<sup>72</sup> Just as with the density of real properties, controlling the density of augmented properties would be an appropriate task for municipal regulators to do through zoning.

Municipalities could have different perspectives on augmented reality zoning. It might be important for one municipality that established zones and city plans be respected in a technologically neutral fashion, applying regulations regarding advertising to both physical signs and augmented reality overlays; conversely, one could also imagine that a city might be more concerned with the visual blight of physical signs, and less concerned, and less aware, of the effects of augmented reality. As there is no single “right” way to approach augmented reality and its effect on the city, zoning provides an appropriate mechanism for city regulators to balance those concerns in a locally sensitive manner.

## 5. A Trio of Options

Hence, although there is no right not to be mapped, there are nevertheless potential impacts on property owners. As noted, it could lead to changes that affect the residential, historic, or natural character of an area. From a regulator’s perspective, zoning is the most relevant tool to regulate augmented reality technology to balance mitigating the likelihood of significant injuries to property owners’ enjoyment of their properties while maintaining the public benefits of the digital maps and of the augmented reality technologies that depend on them.

Developing a regulatory framework for the management of augmented reality requires solutions found in both law and technology. Rather than address augmented reality on a piecemeal basis, we propose three broad regulatory processes that would provide guidance for a substantive response to the technology. These are, first, reliance on zoning at the municipal level; second, the creation of a catalogue or directory of augmented reality applications; and third, addressing the relationship between affected parties by developing either a licensing or micro-payment scheme. As a legal mechanism, we recommend municipal zoning; as a technological mechanism, we recommend catalogues of augmented reality applications; and as a market solution, we recommend a licensing scheme.

**Zoning:** Zoning rules and regulations at the municipal level are suited to managing the use of augmented reality. The municipal government should ensure that municipal rules incorporate augmented reality in its zoning framework, by applying existing rules where they fit and by creating new rules where the technology raises distinct issues. On a broader level, a municipality should consider technology in the scope of zoning aims and regulations. A city could choose to create zones where augmented reality is permitted in the city, for example limiting it to commercial areas. Or it could require a permit for its use in all city public parks, providing that the regulation was carefully drafted to safeguard constitutional rights such as free speech, heeding the example of Milwaukee, Wisconsin, where a local ordinance requiring augmented reality applications to seek a permit for use in a public park was struck down as overbroad.<sup>73</sup>

One zoning option is to categorize augmented reality applications according to city zones (e.g., excluding applications with adult content from school zones) or creating designating augmented reality areas. Short of this option, there are many opportunities to incorporate augmented reality into existing by-laws and regulations. For example, cities typically have numerous regulations concerning

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<sup>72</sup> Malcolm Gladwell defines a tipping point as “the moment of critical mass, the threshold, the boiling point.” (Gladwell 2000, p. 12).

<sup>73</sup> See (County Legislative Information Center 2016). See *Candy Lab Inc. v. Milwaukee County et al.*, Case No. 17-CV-569-JPS. See <http://www.wassom.com/mitechnews-reports-candy-lab-v-milwaukee.html>, discussing the ordinance being struck down for over-breadth.

signage and advertisements. Referring again to the City of Ottawa by-law 2004-239,<sup>74</sup> which bans temporary signs on residential properties, “signs” are defined as:<sup>75</sup>

any visual medium used to convey information by way of words, pictures, graphics, emblems or symbols, or any device used for the purpose of providing direction, information, identification, advertisement, business promotion or the promotion of a product, activity, service or idea.

This definitional language of “any visual medium” could be interpreted as already including augmented reality within its scope; alternatively, clarifying amendments to a by-law like this could address any ambiguities. Similarly the city of Ottawa by-laws concerning permanent signs on private property<sup>76</sup> provide many opportunities for the municipality to detail exactly the circumstances in which permanent signs are allowed. Currently billboards are not allowed in residential areas,<sup>77</sup> nor are any signs that are “illuminated, animated or operated in such a way that it constitutes a hazardous distraction for vehicular or pedestrian traffic.”<sup>78</sup> The by-law contains a definition for “animated signs,”<sup>79</sup> which refers to a sign with “movement, motion or the appearance of motion by way of motion picture, video, television, LED screens or any technology that would facilitate motion or the appearance of motion.” It contains a definition of “digital billboards,”<sup>80</sup> which is an “off-premise sign that displays information or images on a digital or electronic screen.” Lastly it contains a definition of a “projected image” sign,<sup>81</sup> which is a sign that “is projected from or by a source external to the sign onto a surface where the sign copy image is displayed,” but does not include a projected image displayed for temporary sports or cultural events. None of these types of signage are permitted without either the correct permit, and/or in a permissible municipal zone.

This detailed approach in municipal bylaws to allowable signage suggests that classifying what kind of sign a commercial advertising is, evaluating its impact on the area, and assessing its permanence, is the type of analysis that city councils have undertaken in the past and would be within their scope for augmented reality content as well. One possibility is to recognize a spectrum of zoning practices by which the municipality could develop a plan to manage the impact of augmented reality on properties, neighborhoods, and people. An initial step could be to read in or amend relevant by-laws to include augmented reality in their scope; a later effort could be to carve out zones in which augmented reality is allowed.

**Catalogue or Directory:** A second tool for the management of augmented reality is to create a catalogue or directory of augmented reality applications, recognizing that there is utility in recording and providing public notice to the information for property owners, municipal regulators, and augmented reality companies. Inspiration for this comes from the Canadian federal databases for trademarks<sup>82</sup> and copyright,<sup>83</sup> which act as repositories of registered trademarks and copyrights. Instituting a directory of augmented reality applications could serve multiple purposes. Primarily, a catalogue would be a way to provide transparency about augmented reality applications. For property owners, being able to locate information about activities occurring around one’s home

<sup>74</sup> City of Ottawa, “Temporary Signs Private,” By-Law 2004-239.

<sup>75</sup> City of Ottawa, “Temporary Signs Private,” By-Law 2004-239, Section 1, Definitions.

<sup>76</sup> City of Ottawa, “Permanent Signs On Private Property,” By-Law 2016-326.

<sup>77</sup> City of Ottawa, “Permanent Signs On Private Property,” By-Law 2016-326, Part 5, section 59 (the Chief Building Official is not authorized to approve an application for a minor variance that (b) permits a billboard in a residential or environmental protection zone; or (d) permits a digital wall sign other than a digital menu board or a message centre for a theatre or cinema).

<sup>78</sup> City of Ottawa, “Permanent Signs On Private Property,” By-Law 2016-326, Part 7, section 83 (e); see also Part 7, section 95: “Every owner of a permanent sign shall ensure that the sign structure is located so as not to interfere with vehicular or pedestrian movement or become a nuisance or hazard for any vehicle or person.”

<sup>79</sup> City of Ottawa, “Permanent Signs On Private Property,” By-Law 2016-326, Part 1, Section 1.

<sup>80</sup> City of Ottawa, “Permanent Signs On Private Property,” By-Law 2016-326, Part 1, Section 1.

<sup>81</sup> City of Ottawa, “Permanent Signs On Private Property,” By-Law 2016-326, Part 1, Section 1.

<sup>82</sup> Canadian Trademarks Database, <http://www.ic.gc.ca/app/opic-cipo/trdmrks/srch/home?lang=eng>.

<sup>83</sup> Canadian Copyrights Database, <https://www.ic.gc.ca/app/opic-cipo/cpyrghts/dsplySrch.do?lang=eng>.

would ensure transparency of information about otherwise unknown processes. For the municipality, being able to access information about augmented reality applications and their contents would be important should there be a public policy question whether to prevent the use of particular content in specific areas. The catalogue would also be helpful for developers of augmented reality applications. A system of registration would provide public notice of the activities in and around buildings, homes, and areas of the city. A catalogue could also be used for different regulatory options described below, including the regulatory option of creating a compulsory licensing system with corresponding payments to the property owners or the technological option of the game designers including a system of micropayments in the augmented reality application to be distributed back to property owners whose properties are affected (for example, through an increase in pedestrian or vehicular traffic).

The exact purpose of the directory would need to be established, particularly because the information collected for the directory would depend on the goals of the system. If it is to be used primarily for purposes of transparency it might contain less information; if it is tied to a more complex monetary or licensing system, then more detailed information would be collected.<sup>84</sup> The procedures for a catalogue of the real properties in augmented reality systems might entail application developers submitting information to a centralized database identifying the geographic scope of the application, the digital map that is used, and which properties are featured as points of interest. With a centralized database, property owners could search their geographic coordinates to identify which applications are active in their areas and if any applications have featured their address. This would alleviate property owners from the difficult task of ascertaining which applications include their address and of downloading and routinely checking each application to monitor how the property is used.

Implementing a centralized database, and shifting the burden of populating it to the owners of the augmented reality applications, would also be commensurate with the heightened regulatory attention on the hidden costs to users and to the public of the technology sector's revenue models. There is currently a push by regulators for increased transparency in regard to technology activities, most notably with the increased regulatory pressure on Facebook (which includes Instagram) and of Google (which includes YouTube) with respect to their model of advertising revenue based on the personal information of their users (Lunden 2016). Establishing an augmented reality database would proactively address concerns that may be expected to arise when the unseen effects of augmented reality technology receive a similar level of legislative and media scrutiny. Moral hazards and free riding within the technology sector may be expected to receive increased attention by regulators, who may turn to approaches such as mandatory publicly accessible catalogues to require more transparency from technology companies about the potential impacts of their technologies on real property.

**Micro-payments and Licensing:** Third, we suggest that the nature of augmented reality requires management of the relationship between creators of applications and the properties, places, and people they impact. Two possible devices for doing this are a micro-payment system and/or compulsory licensing. A micro-payment system would allow a property owner or business to charge the application creator for use of their property. Creating a micro-payment system would effectively recognize that augmented reality does have an impact on resources in the real world and provide a means for compensation. The technical capacity for creating a micro-payment system already exists. In relation to Pokémon Go for example, businesses pay Niantic an amount for each person using the app that visits their location.<sup>85</sup> A micro-payment scheme could adapt this system to allow for payments to, as well as from, affected parties, for example where specific properties are identified in the application

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<sup>84</sup> The Canadian Federal Trademarks database collects information on the category, type, status, action, dates, and Vienna Classification. The Canadian Federal Copyrights Database collects information on author, category, country of publication, owner/assignee name, registration number, title, and year. An augmented reality directory could collect an even smaller amount of information, following the more minimalist example set by the Canadian Federal Corporation database. See online: <https://www.ic.gc.ca/app/scr/cc/CorporationsCanada/fdrICrpSrch.html>.

<sup>85</sup> Reportedly, McDonalds pays up to 50 cents per visitor to their restaurants. See Constine 2017.

as a point of interest. By illustration, in the Pokémon Go litigation homeowners complained about being designated a Pokéstop. The system could be set up so the application owner or the individual players pay the property owners. Similarly, such payments could go to a public fund to support municipal projects or to cover unforeseen damage to public resources such as waterways, historic sites, or public parks.

Connected to a micro-payment scheme is the idea of establishing a compulsory licensing scheme. Compulsory licensing would allow a property owner to license out the augmented reality space that exists around their property. The licensing system would allow property owners to control the ways in which their property is affected and to select the types of content that may be shown at those coordinates. Establishing a compulsory licensing scheme could afford opportunities for entire neighborhoods to create licenses for content and possibly benefit financially at the same time. The design of the licensing scheme should comply with zoning rules; for example, if municipal by-laws limit which categories of content may be displayed in residential areas, licenses between residential property owners and technology companies could not contravene those rules by licensing content zoned only for commercial areas. A licensing scheme has the benefit of applying existing rules and laws (in contract and in real property) for the licensing of digital content (and parallels existing systems in copyright). It could achieve similar objectives for real property as the licensing schemes for intellectual property by providing a means for real property owners to consent, while also avoiding the poor fit of real property torts such as trespass and nuisance. Rather than a right to be excluded from a map, real property owners would have a right to license the use of their property's location to technology companies who wish to use it as point of interest in an augmented reality application.

Over time, as augmented reality technology has deeper penetration, it will undoubtedly become increasingly complex to manage its use among an ever-increasing variety of property types. Imagine the use of augmented reality in a high-rise apartment or commercial building. If one apartment or commercial enterprise opts out of inclusion in an application, does that mean the entire building has to opt out? Or if a commercial enterprise on the ground floor of an apartment building wants to generate income by allowing augmented reality advertisements, should the residents of the apartment building have a say in the nature of the advertisements? How will the potentially divergent interests of the building owners and tenants be weighed? Should it be the municipality who monitors proposals for augmented reality content? These scenarios will likely be increasingly common with municipal support for mixed-use properties that incorporate commercial and residential units. How will companies working with augmented reality differentiate between the multiple strata (identified through the floors in a building) when the current GPS technology relies on coordinates that only measure the ground area? The three proposed solutions of zoning, creating a catalogue, and creating a system of micro-payments and licensing, will provide opportunities for addressing these complexities in a principled manner. In the immediate timeframe, the solutions will assuage fears of the unknown felt by property owners and communities, and assist government regulators by promoting transparency.

## 6. Conclusions

The impact that augmented reality may have on a community's people and places—and not just on the individuals who choose to engage with the technology—was a critical underlying question in *Re Pokémon Go* although it was not interrogated as such in the case, and remains an important question for augmented reality in general. It is perhaps telling that a swift response to the first popular augmented reality phenomenon was litigation that pitted individual property owners against large technology companies. That case highlights tensions between early adopters and innovators of new technologies and the individuals who are affected by the technologies but who may not have consented to being included in these applications or who may not understand the ramifications of their inclusion. Pokémon Go's components of an augmented reality application, created by a large technology company, based on digital mapping processes, operated through self-navigation by the individual user, and incorporating the real properties of others into its processes, is emblematic of

the third enclosure movement where intellectual property affects real property. It is also indicative, we argue, of the need to look beyond the traditional legal frameworks of real property, with its emphasis on the right to exclude, and intellectual property, with its emphasis on non-rivalrousness, toward legal frameworks such as zoning to balance the interests of real and intellectual property owners, neighborhoods and communities, and the broader public interest.

It might be tempting to address the conflict between individual property owners versus technology companies by categorizing augmented reality applications' effects on real property as either a real property law issue or as an intellectual property law issue. Indeed, the parties' claims in *Re Pokémon Go* were framed around the concerns of those holding rights in a depletable real property on the one hand, and the enthusiasm of those touting the added value of intellectual property on the other. Perceiving that the indexing of their properties in augmented reality applications could cause harm, the residential property owners in that case tried to use real property torts to redress the effects. Yet, real property torts are not well adapted to address these injuries. As we argue, their claims more accurately might be characterized as a "right not to be mapped." However, the law has not yet recognized a right not to be mapped, and there are public policy reasons weighing against its recognition. Digital maps offer important public benefits for information access, and their utility would be undermined by largescale opt outs. There are strong public benefits to digital maps, which depend on maps being comprehensive and accurate for the dataset that they represent. If the law were to recognize a broad right to opt out of having one's property included on a map as part of a real property owner's rights, it could undermine the public value of digital maps.

But, *how* these digital maps are used in augmented reality applications could be regulated to address concerns such as increases in traffic, noise, or pollution, which may affect individual real property owners and also wider interests shared by neighborhoods and municipalities. A full regulatory and legal response to augmented reality should develop mechanisms that reflect the public interest in how geolocative technologies might affect real property and the broader community. We suggest a trio of regulatory options to balance the numerous interests of real property owners, intellectual property owners, neighborhood communities, and municipalities, and to recognize the public interest in nurturing digital mapping and facilitating innovative technologies. These suggestions go beyond traditional legal responses situated in real property law and intellectual property law. First, we recommend that city regulators apply real property zoning principles to augmented reality, which would enable a technologically neutral deployment of zoning. The same principles that underlie existing zoning laws, such as safety, noise reduction, traffic calming, historical preservation, or aesthetics, could be extended to regulate augmented reality's effect on real property. Additionally, we suggest that catalogues of augmented reality applications be created to provide information on augmented reality's potential impact on real property in order to support zoning decisions and for public notice. Placing the responsibility for those catalogues on the technology companies would alleviate real property owners from the burden of identifying, accessing, and monitoring the applications that incorporate their real properties and would provide detailed information for city councils and urban planners. Third, we also suggest the possibility of licensing schemes with micropayments for the affected real properties, payments that could come either from the owners of the augmented reality applications that incorporate those locations as a featured site or from the application users who visit those locations. Together these three mechanisms of legal zoning principles, a digital catalogue system, and a market-based licensing scheme are processes that could be used to develop a measured and responsible approach to augmented reality technology.

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