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OVERCOMING POTENTIAL EXCLUSIVITY ASSOCIATED WITH IMPACT FEES: LOVELAND, COLORADO'S 30-YEAR EXPERIENCE IN DEVELOPMENT IMPACT FEES

Larry L. Lawhon

Rapid community growth and taxpayer resistance accentuated the difficulties in providing growth-related facilities and services that the city of Loveland, Colorado, experienced in the early 1980s. As a result of this challenge, Loveland became a pioneer in impact-fee use in 1984 by making new growth "pay its way," which some suggest adversely affects housing affordability and diversity and makes communities more exclusive. This research begins with an in-depth investigation of Loveland's now 30-year-old impact-fee program, which has generated over $119.1 million for capital projects since 1984, emphasizing the actions that have been taken to offset the potential exclusionary effects of the program. It then compares Loveland with three surrounding communities — Longmont, Greeley, and Fort Collins — utilizing analysis of covariance to determine whether the Loveland impact-fee program has rendered the city more exclusive than these other communities. The findings suggest that Loveland is not statistically different from the sample communities with regard to annual median family income and number of rental units per nonwhite residents and that Loveland's growth and development trends, over time, are similar to those of the sample communities. This research provides useful insight for communities faced with declining revenues and community growth who have a desire to promote housing diversity while maintaining suitable levels of community facilities and services.

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INTRODUCTION

The city of Loveland, Colorado, pioneered the use of development impact fees to pay for growth-related services and facilities in the Colorado Front Range. Voter opposition to increased taxes for growth-related infrastructure and services eventually required the city, in 1984, to consider using development impact fees to shift the cost of new development to those creating the need — new residents and businesses. Thus, new residential, commercial, industrial, and institutional uses would each be responsible for their proportional fair share of the costs of development through a capital expansion fee (CEF) utilized in concert with the Loveland Capital Improvements Program (CIP) to expand capital facilities and services. The American Planning Association rewarded Loveland's cost recovery program efforts with an innovation planning program award in 1986, recognizing the uniqueness of the impact-fee approach (Barnebey, *et al.*, 1988). The program has generated over $119.1 million in revenue since 1984 (Krcmarik, 2014a).

This paper has several purposes. First, it will define development impact fees and explain the authority that enables local governments to impose them. Second, it will discuss the historical culture in which development impact fees were adopted in Loveland, Colorado. It will then discuss the structure and use of impact fees in Loveland, followed by an evaluation of the program's success in providing services and facilities to accommodate growth, noting some major projects completed with impact-fee funds. Fifth, it will discuss the issue of equity and fairness with regard to Loveland's impact fees. Sixth, it will use regression analysis to assess whether Loveland is a more exclusive community than three surrounding communities that expanded their impact-fee use after Loveland. Finally, it will conclude with insight from Loveland's 30-year impact-fee experience that is valuable for planners and public officials.

DEVELOPMENT IMPACT FEES DEFINED

Development impact fees, a onetime charge paid by new development, offset the impact of the new use on a city's infrastructure and the services necessary to serve the new development (Nelson and Moody, 2003; Robinson & Cole, LLP, 2008). The fees are generally paid at the time a building permit (or sometimes a certificate of occupancy) is issued and the building is suitable for occupancy. To withstand legal challenges, there must be a reasonable relationship between the fee and the impact of the development on infrastructure and services, and the fee must pass the *Nollan/Dolan* essential nexus test[1] and be roughly proportional to the cost of providing the service or infrastructure. Cities likewise must ensure that the fees will be expended such that those paying the fees receive beneficial infrastructure and services in proportion to the fees paid (Mullen, 2015). Owners and developers are protected against unreasonable fees that bear no relationship to the impact of the proposed development on the community since local governments must comply with the *Nollan/Dolan* test. Typically, a city will define what it costs to provide services and infrastructure on a per-dwelling-unit or per-square-foot basis.

As of 2015, 29 states have adopted state impact-fee enabling legislation (Mullen, 2015). Alternatively, communities without such specific legislation derive their authority to impose impact fees from their broad local "police power," or their authority to make regulations to protect the health, safety, and general welfare of their citizens. Historically, development impact fees have been described as funding "off-site" improvements related to the impact created by new development, such as arterial streets, libraries, and community or regional parks; some communities include general government expenses and police and fire services as off-site costs as well. The types of fees a city chooses may be limited by state impact-fee enabling acts; absent enabling legislation, fees must be related to the impact of the development on the community. In contrast, "on-site" improvements are internal improvements to a site that a developer provides through exactions and subdivision conditions that do not typically address the off-site impacts of the new development.

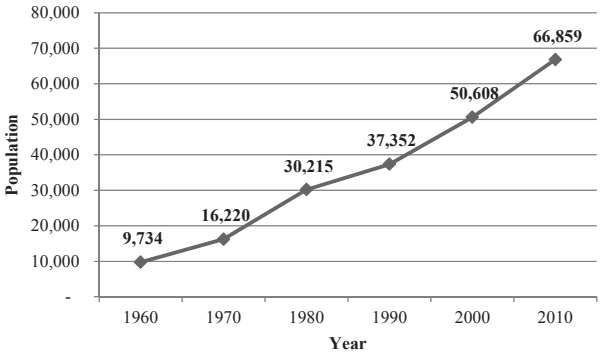

FIGURE 1. Population of Loveland, Colorado, 1960-2010 (Data source: Colorado Department of Local Affairs, n.d.).

When impact fees are collected, they are placed in one or more earmarked accounts for various infrastructure improvements or services — water, sewer, streets, libraries, parks, general government, schools — and are expended exclusively for growth-related impacts or projects.

Loveland, like many cities, had historically utilized debt financing, such as general obligation bonds, to pay for off-site services and facilities that benefited the community as a whole. Such financing is typically repaid through increased property taxes (Nelson and Moody, 2003). However, in the 1970s, local residents began to question their role in paying for infrastructure and services that were required, presumably, to benefit new development, forcing the local government to seek other funding techniques for off-site improvements. Impact fees were offered as an alternative to debt financing.

Lawhon (2012) found that impact-fee use by local governments has increased during the last decade; 40% of randomly selected United States cities were charging impact fees in 2012, an increase from 26% in 2002, and areas in the Mountain West, Pacific, and Southeast Atlantic states, all high-growth regions, were the most prolific users of impact fees. Local government motivation to use impact fees is often based on the lack of alternative funding methods to pay for growth-specific needs. Shifting this cost to future residents through impact fees is "politically beguiling" for elected officials since it is often much easier than asking existing residents to pay increased taxes to fund improvements related to infrastructure and services for new growth (Frank and Downing, 1988). Public motivation for impact fees often relates to the public's desire to shift the cost of new infrastructure and services from themselves to those new residents and businesses that create the need for new infrastructure and services.

HISTORICAL SETTING AND CULTURE OF IMPACT FEES IN LOVELAND

Rapid population growth and slow general-fund revenue growth in the late 1970s and early 1980s forced Loveland city officials to consider expanded debt financing to fund infrastructure and services for new development. The Loveland population more than doubled between 1970 and 1983, from 16,220 to 32,700 (City of Loveland Planning Department, 1983:1-3; Colorado Department of Local Affairs, n.d.) (Figure 1). Concurrent with rapid population growth, the Loveland general-fund expenditures, and subsequently the general-fund budget, rose as population increases triggered the need for additional infrastructure, facilities, and services. Streets, parks and recreation, law enforcement, and fire protection costs increased the most, accounting for 66% of the city's general-fund expenditures in 1981 (City of Loveland Planning Department, 1983:2) (Table 1). Meanwhile, revenues increased at a slower pace. An increase in the sales tax rate in 1974, increased property taxes, and large transfers from utility and other accounts made up most of the shortfall initially.

The need to expand services and facilities induced by growth in particular streets was overwhelming for city officials. Faced with increased growth, inflation, and shrinking per capita revenues, in June 1981, the city council passed an ordinance to increase the sales tax rate from 2% to 3%, subject to voter approval on August 4. On the ballot, the city sought approval for an increase in the sales

TABLE 1. Comparison of Loveland's general-fund expenditures in 1970 and 1981 (Data source: City of Loveland Planning Department, 1983).

Expenditure category	Expenditures (thousands)		Percent of total expenditures		1970-1981 annual growth
	1970	1981	1970	1981	
General government	$218	$997	18.8%	15.6%	14.8%
Community development	$29	$285	2.5%	4.5%	23.3%
Law enforcement	$215	$1,462	18.5%	22.9%	19.1%
Fire protection	$61	$641	5.3%	10.0%	23.8%
Parks and recreation	$187	$1,153	16.1%	18.1%	18.0%
Streets and roads	$308	$957	26.5%	15.0%	12.7%
Other public works	$55	$361	4.7%	5.7%	18.7%
Library and museum	$88	$378	7.6%	5.9%	14.1%
Social services	--	$148	--	2.3%	--
Total	$1,161	$6,382	100.0%	100.0%	16.8%

tax and four general obligation bond questions, which, when combined with the proposed sales tax increase, were collectively designed to generate approximately $40 million in funds for general-fund infrastructure, buildings, and other improvements.[2] The general obligation bond questions included the following appropriations: $7 million for street improvements; $13.2 million for building-related items, including law enforcement and fire protection equipment and structures, library services, and a municipal maintenance and service facility; $2.9 million for recreation services, including improvements to the municipal golf course, a recreation building and furnishings, and facilities for senior citizens; and $3.4 million for city parks, hiking trails, and other municipal beautification improvements. The general obligation bonds, if approved, were to be repaid through resident property taxes over a 20-year period (City of Loveland, 1981a, 1981b, 1981c, 1981d).

In the weeks prior to the election, both protax and antitax groups gained momentum, with antitax sentiment appearing strong. The *Loveland Daily Reporter-Herald* headline on Wednesday, August 5, 1981, declared, "Voters send clear message: No more taxes" (McGrath, 1981). According to the newspaper, 35% of Loveland registered voters reversed a trend in voter apathy as they swamped polling places to express their concern over the bond questions, sale of public buildings, and proposed sales tax increase.

In response to the failed bond questions and sales tax increase, the Loveland city council shifted its attention to finding a new revenue source. It subsequently approved Resolution R-171-81, which recognized that Loveland voters had refused to support further taxation and that new development should pay its share of general government costs (City of Loveland, 1981e). This resolution set in motion events that would lead to the hiring of a consulting firm, Browne, Bortz & Coddington (BB&C), and the appointment of a Cost of Growth Advisory Committee to develop a "service cost recovery system." The Cost of Growth Advisory Committee ultimately met for 18 months to consider the city's options (Barnebey, *et al.*, 1988) and "ensure that adequate public services and facilities are provided … by developing a capital expansion fee structure … borne by new residents" (City of Loveland Planning Department, 1983:vii). Improvements were tied to the Loveland CIP.

ESTABLISHING LOVELAND'S CEF

In line with the Cost of Growth Advisory Committee's recommendations, the city council codified the CEF by adopting Ordinance 3045 on January 4, 1984, which imposed a fee on new development to offset the cost of new capital facilities and services necessitated by new development (City of Loveland, 1984). The ordinance, which went into effect July 1, amended Title 16 of the Loveland

TABLE 2. CEF schedule for Loveland, Colorado, 1984 (Data source: City of Loveland, 1984).

Fee category	Residential (per unit) (density in dwelling units per acre)				Commercial (per square foot of floor area)			Industrial (per acre)
	0-1 (estate)	2-6 (low density)	7-11 (medium density)	12-max. permitted (high density)	Retail	Office	Institution	
Parks and recreation	$736	$736	$736	$736	--	--	--	--
Fire protection	$98	$98	$98	$98	$.07	$.07	$.07	$746
Law enforcement	$24	$24	$24	$24	$.02	$.02	$.02	$179
Library	$121	$121	$121	$121	--	--	--	--
Museum	$58	$58	$58	$58	--	--	--	--
General government	$271	$271	$271	$271	$.19	$.19	$.20	$2,020
Streets	$268	$240	$215	$157	$.80	$.32	$.59	$1,601
Subtotal	$1,576	$1,548	$1,523	$1,465	$1.08	$.60	$.88	$4,546
Drainage fee (per acre)	$658	$805	$1,145	$1,453	$1,559	$1,559	$1,559	$1,543

Municipal Code, adding Chapter 16.38 to establish a fee schedule for residential uses on a per-unit basis, commercial uses (retail, office, institution) on a per-square-foot basis, and industrial uses on a per-acre-of-lot basis (City of Loveland, 2014) (Table 2). Land uses not linked to a certain category were not charged a fee for that category. For new and expanded uses, the ordinance required the CEF to be paid at the building-permit stage. The ordinance allowed the city to deposit the CEF funds into a public works account and use them as needed (consistent with the CIP) to pay for expanded services and facilities within the category in which the fee was collected. Finally, the ordinance established a provision for the annual review and update of the CEF structure and fee schedule (*ibid.*).

Initially, the CEF only funded specific facilities and services contained in Ordinance 3045. However, city officials recognized that new growth also impacted equipment needed to successfully provide some of the services; for example, fire equipment was needed in fire stations. Thus, in 1997, the CEF was adjusted to provide for "fully equipped facilities," enabling the city to collect CEFs to fund not only facilities but also the equipment needed to operate them. A "trails" category was added in 1993, followed by an "open lands" category in 2002. In addition to CEFs, the city charges system impact fees (SIF) for water and sewer utilities and a plant investment fee (PIF) for the city-owned electric utility (Table 3).

Current Fees

Since 1984, Loveland's CEFs have increased to account for inflation and the increasing costs of facilities and services. Fees for new single-family development are currently $13,030 per unit. Table 4 provides the fee structure (in rounded dollars) adopted in 2013 for a typical single-family detached home and multifamily housing in Loveland. Commercial and industrial uses are only charged fees for fire and rescue, law enforcement, general government, and streets on a per-square-foot basis.

EVALUATING THE SUCCESS OF THE LOVELAND PROGRAM

Confronted by existing resident opposition to increased taxes, the Loveland governing body had to decide whether to reduce services, eliminate some services, restrict growth, or find an alternative

TABLE 3. Timeline for Loveland's CEF program (Data sources: Krcmarik, 2009, 2010, 2014a).

1981	City council adopted Resolution R-171-81, identifying the need for a system to address growth-related expenses
1982	Consulting firm BB&C hired to help develop a solution; city council appointed Cost of Growth Advisory Committee consisting of a broad cross-section of community residents to develop recommendations to pay for growth
1983	Service cost recovery system report and committee recommendations completed
1984	Ordinance 3045 adopted January 4 to implement CEFs
1993	Trails added to the list of CEF services/facilities
1994	BB&C and staff updated fees, and city moved toward an annual inflation increase for each fee
1997	City adopted a "fully equipped facilities" cost approach that required CEFs to fund both facilities and the equipment needed to run them (*e.g.*, fire station and fire trucks)
2001	Street CEFs updated based on 2020 street master plan
2002	Open lands added to the list of CEF services/facilities
2009	In response to need for more affordable housing, city council approved a 61% reduction in multifamily CEFs, excluding the street CEF; SIFs and PIFs for water, sewer, and electric utilities were not reduced
2010	City council extended the reduction in multifamily CEFs through December 31
2012	City council directed adjustments to multifamily CEFs, reducing them by approximately 30.5%
2013	City council directed staff to prepare updates for January 2013 based on master plans for the improvements associated with each CEF; city council approved inflationary adjustments to CEFs effective January 2014

TABLE 4. Single-family and multifamily residential CEFs adopted for Loveland in 2013 (Data source: Krcmarik, 2014a).

Fee category	Single family	Multifamily
Fire and rescue	$894	$621
Law enforcement	$880	$612
General government	$1,090	$758
Library	$727	$505
Museum and cultural services	$606	$422
Parks	$3,551	$2,468
Recreation	$1,582	$1,099
Trails	$530	$368
Open lands	$890	$618
Streets	$2,280	$1,584
Total CEF per unit	$13,030	$9,055

financing method. It chose to pursue impact fees to fund facilities and services. Fortunately, since 1984, the Loveland impact fees have proven effective as an alternative financing method for capital projects, generating over $119.1 million to expand infrastructure, facilities, and services to serve new growth (Figure 2). In addition, the city has earned over $3.5 million in interest on the fees, which are placed in interest-bearing accounts (Krcmarik, 2014c). The CEFs have been used to complete a number of key projects, including several extensive street improvement projects, a police and courts building, police cars and equipment, two fire stations, a fire administration building, a trail underpass for U.S. Route 34, and an expansion study for the city library.

EQUITY AND FAIRNESS

Impact fees are often criticized on the basis of equity and fairness, issues that surface when impact fees and other land-use regulations result in seemingly exclusionary effects. While the justification for imposing impact fees is often to make new growth pay its way, exclusion may result as an unintended (or sometimes intended) consequence. Burge and Ihlanfeldt (2006:6) cited "three frequently mentioned motivations [for] exclusionary land-use regulations — the externality rationale, the fiscal rationale, and pure prejudice." The externality rationale asserts that multifamily uses may

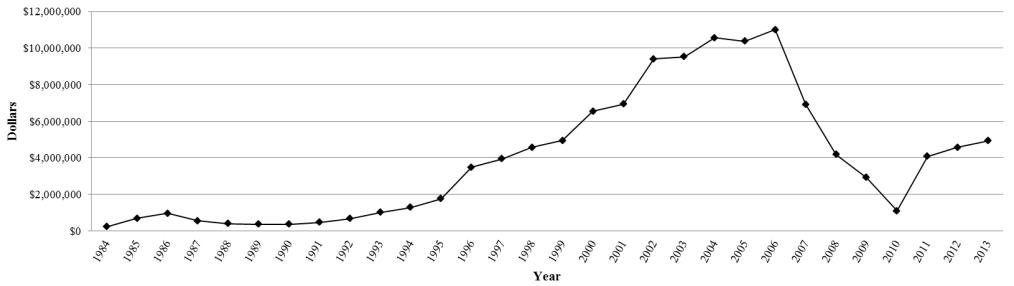

FIGURE 2. CEFs collected in Loveland from 1984 through 2013. The decline in fees collected between 2007 and 2010 reflects a decline in building permits issued. An additional $499,941 had been collected through the end of February 2014 (Data source: Krcmarik, 2014a).

lower surrounding property values and/or create other negative externalities, and a community may be encouraged to withhold development approval that creates such externalities. The fiscal rationale asserts that less affluent households do not pay their fair share of public services and infrastructure, and if these households occupy less costly housing, they pay less property tax. Under this guise, communities might rationalize that approval of projects containing apartments is not fiscally sound. Finally, some communities develop exclusionary regulations predicated on pure prejudice simply to keep out those unlike themselves, and apartments and smaller dwelling units may not be approved as a result (Burge and Ihlanfeldt, 2006). Although impact fees are typically upheld as a valid land-use regulation and are a valid use of local police power in many states (Mullen, 2015), they may have exclusionary effects and adversely affect both lower-income households and the lower-wage workforce (Bobo, 2001).

In addition to purported exclusionary effects, some claim that impact fees adversely affect housing affordability as well. However, Ihlanfeldt and Shaughnessy (2004:640) suggested that "not much is known regarding the economic incidence of impact fees — *i.e.*, who is it that actually bears the burden of the fees — developers, new homebuyers, or owners of undeveloped land?" The authors emphasized that how this burden is distributed is important for policy reasons, specifically "the availability of affordable housing for lower-income households in job-rich suburban communities and the negative externalities that allegedly result from suburban sprawl" (*ibid.*). Ihlanfeldt and Shaughnessy reviewed past research related to the incidence of impact fees, criticizing it as inconsistent with expectations derived from economic theory. Specifically, they presented two theoretical views contained in the literature on the incidence of impact fees: the "old view" and the "new view." Early research on impact fees and affordability subscribed to what Ihlanfeldt and Shaughnessy (2004:641) suggested is an outmoded view:

> *The old view treats impact fees as an excise tax on developers, ignoring the new public capital services (or infrastructure) that are financed by the fees. Hence, under the old view, the imposition of an impact fee in a competitive market results in … the supply of new housing [increasing] by the amount of the fee, resulting in a higher price paid by new homebuyers, a lower net price received by developers, and a lower quantity of new homes built.*

In contrast, the new view of the economic effects of impact fees "(1) incorporates the public capital services that are financed by the fees [into the price of housing], (2) recognizes the impact of property tax capitalization on the incidence of the fees, and (3) assumes that the housing demand curve facing construction firms in a single jurisdiction is horizontal" (*i.e.*, that new homebuyers are mobile) (Ihlanfeldt and Shaughnessy, 2004:642; see also Nelson and Moody, 2003). This means that, while

> *the imposition of the fee has no direct effect on the price of housing[,] the benefits that accrue to new homebuyers from the infrastructure financed from the fee are capitalized into*

> *new home prices. … The fee is borne by the homebuyer in the form of a higher housing price, but [the] net of the benefits received from the fee-financed infrastructure [results in] no burden.*
> (Ihlanfeldt and Shaughnessy, 2004:642)

To corroborate this new view, Ihlanfeldt and Shaughnessy (2004) showed that the price of both new and existing housing in Dade County, Florida, increased at the same rate, and the resulting price increase was commensurate with the value of the capital facilities constructed with the impact fees imposed by the county. They concluded that, in Dade County, the capital facilities paid for by impact fees were capitalized into the price of housing and thus did not support the argument that impact fees reduce housing affordability (*ibid.*).

Recent research seems to contradict the conventional old view that impact fees increase the price of housing dramatically, making it unaffordable. Both Burge and Ihlanfeldt (2006) and Ihlanfeldt and Shaughnessy (2004) suggested that the price of housing would be about the same regardless of whether impact fees are imposed. This is partly because in locations where impact fees are not imposed, mill levies and/or property taxes are likely to increase, within reason, to fund the infrastructure necessary to accommodate growth. Meanwhile, in locations where impact fees are imposed, the value of the funded improvements is capitalized into the price of new housing. Thus, as Burge and Ihlanfeldt (2006:6) explained, "[I]mpact fees lessen the fiscal deficit imposed on the community by low-income housing, because a portion of the costs of the new public infrastructure is no longer borne by the average property owner in the form of higher property taxes."

In the final analysis, it is difficult to precisely discern from the available research whether impact-fee policies have a positive or negative effect on the price of housing. The old view claimed that impact fees result in unfavorable outcomes with regard to housing affordability and diversity, while the new view suggests that impact fees have some positive benefits, do not reduce housing affordability, and can promote affordable housing options in some instances.

Loveland's Response to Equity and Fairness Concerns

The city of Loveland pursued several initiatives designed to mitigate the purported adverse effects of its impact-fee policy on housing affordability and diversity. For example, the city council may grant, by resolution, a CEF exemption for "qualified affordable housing" for developments that set aside units for 20 years for income-qualifying households earning less than 80% of the area median income (City of Loveland, 2014:Sect. 16.38.080). If qualified rental or owner-occupied housing is made available or sold to a non-income-qualified household within 20 years, a prorated percentage of the waived fees is reimbursed to the city and placed in its Affordable Housing Fund, which was established in 2004 (City of Loveland, 2014:Ch. 16.43). Affordable housing funds may be expended at the discretion of the city council to encourage or underwrite affordable housing ventures (McClure, 2010).

In 2009, the city council implemented a temporary 61% reduction in multifamily CEFs, excluding street CEFs; they later extended the waiver through the end of 2010. By extending the waiver, the council encouraged the construction of approximately 543 multifamily housing units and expanded the community's housing diversity (Krcmarik, 2012). Though the waiver was not continued in 2011, multifamily CEFs were reduced by 30.5% of the existing fee amount in 2012 (effective in 2013), a move designed to encourage multifamily construction.

Through these actions, the city has taken steps to offset any purported negative effects of its impact fees on housing diversity. Both single-family and multifamily home construction have continued in response to housing demand.

THE LOVELAND IMPACT-FEE POLICY AND EXCLUSIVITY

The old view of the effects of impact fees suggests that the fees increase the price of housing, making it less affordable for some residents, while discouraging developers from building both single-family and multifamily housing until market correction restores equilibrium. A common theme in the old-view literature is that impact fees make development more costly and "push out" less affluent households because it becomes more difficult for them to purchase homes or find affordable rental housing. In this view, housing is only affordable for more affluent residents, resulting in a more exclusive community. Proponents of the old view would suggest that the expansion of Loveland's impact-fee policy in 1984 resulted in a more exclusive community.

In order to assess whether the Loveland impact-fee program resulted in exclusivity, the author conducted an analysis of covariance (ANCOVA). Demographic and housing characteristics data from 1960 to 2010 were gathered for the Colorado communities of Loveland, Fort Collins, Longmont, and Greeley from U.S. Census and American Community Survey (ACS) estimates so that changes in the cities' characteristics could be assessed over time (U.S. Census Bureau, 2015a, 2015b). Of interest in this study is how Loveland compared with the surrounding communities and whether it became more exclusive as a result of its impact-fee policy.[3]

Loveland expanded its use of impact fees in 1984; the other three communities subsequently began to expand their impact fees after 1990, doing so over a period of several years. Because fees in each city were adopted at different times, and city contacts did not know the specific dates different fees were adopted over the 30-year period, it was impossible to ascertain exactly when each city expanded its various impact fees. Thus, this paper does not provide information on when each city adopted different impact fees.

Census data for population, race, number of owner-occupied and rental units, and annual median family income were gathered for each of the four communities. Table 5 provides a summary of this information. When Loveland expanded its impact-fee policy in 1984, it moved from conventional water and sewer connection fees to a broad array of impact fees in several categories, including streets, parks and recreation, law enforcement, fire protection, general government, library, and museum. A search of city ordinances and discussions with city personnel for Fort Collins, Longmont, and Greeley indicated that all three communities had water and sewer impact fees in place in the 1980s and began to expand their use of impact fees beginning in the 1990s, with Fort Collins as late as 1996.

Data were gathered for the four communities in 10-year intervals beginning in 1960. The demographic variables selected for this analysis were chosen because they were accessible at the city level and provided insight into the demographic and housing characteristics of the four communities from 1960 to 2010. Table 5 indicates that, in 1960, Loveland had the lowest percentage of nonwhite residents, number of rental units as a percentage of the total housing stock, and annual median family income of the four communities. Although these factors changed for all four communities between 1960 and 2010, Loveland did not appear to differ from the other communities in terms of demographic and housing trends.

Statistical Analysis

The objective of the statistical analysis was to compare the four cities with respect to demographic trends in the communities over time, using U.S. census and ACS data from 1960 to 2010 (U.S. Census Bureau, 2015a, 2015b). To accomplish this, the author utilized an ANCOVA. ANCOVA models are a combination of regression and analysis of variance models, such that there is a treatment factor and one or more numeric regressor variables, called covariates (Kuehl, 2000). In the

TABLE 5. Demographic and socioeconomic data for Loveland, Fort Collins, Longmont, and Greeley, 1960-2010 (Data sources: U.S. Census Bureau, 2015a, 2015b).

Year/City	Total population	White	Black	Other	Percent nonwhite	No. of owner-occupied units	No. of rental units	Total no. of units	No. of rental units as percentage of total	No. of rental units per nonwhite residents	Annual median family income
1960											
Loveland	9,734	9,725	2	7	.09	2,769	1,038	3,807	27.27	115.33	$4,845
Fort Collins	25,027	24,787	77	163	.96	4,906	3,045	7,951	38.30	12.69	$5,409
Longmont	11,489	11,477	2	10	.10	2,893	1,252	4,145	30.21	104.33	$5,372
Greeley	26,314	26,088	81	145	.86	5,223	3,644	8,867	41.10	16.12	$5,351
1970											
Loveland	16,220	16,112	19	89	.67	3,798	2,018	5,816	34.70	18.69	$9,060
Fort Collins	43,337	42,541	250	546	1.84	7,174	6,673	13,847	48.19	8.38	$8,899
Longmont	23,209	23,031	16	162	.77	5,195	2,582	7,777	33.20	14.51	$10,000
Greeley	38,902	38,292	161	449	1.57	6,983	5,268	12,251	43.00	8.64	$9,091
1980											
Loveland	30,244	28,946	79	1,219	4.29	7,303	4,126	11,429	36.10	3.18	$17,499
Fort Collins	65,092	60,914	478	3,700	6.42	12,655	10,874	23,529	46.22	2.60	$21,303
Longmont	42,942	40,307	140	2,495	6.14	9,987	5,500	15,487	35.51	2.09	$19,638
Greeley	53,006	47,386	445	5,175	10.60	10,546	8,806	19,352	45.50	1.57	$19,194
1990											
Loveland	37,352	35,436	111	1,805	5.13	8,965	5,048	14,013	36.02	2.63	$35,139
Fort Collins	87,758	81,877	856	5,025	6.70	17,746	15,943	33,689	47.32	2.71	$37,491
Longmont	51,555	47,810	197	3,548	7.26	12,719	7,391	20,110	36.75	1.97	$37,968
Greeley	60,536	53,936	408	6,192	10.90	12,198	10,449	22,647	46.14	1.58	$30,705
2000											
Loveland	50,608	46,990	188	3,430	7.15	13,699	6,042	19,741	30.61	1.67	$54,337
Fort Collins	118,652	106,347	1,213	11,092	10.37	26,175	19,707	45,882	42.95	1.60	$59,332
Longmont	71,093	60,255	385	10,453	15.24	17,487	9,180	26,667	34.42	.85	$58,037
Greeley	76,930	61,853	672	14,405	19.60	16,142	11,505	27,647	41.61	.76	$45,904
2010											
Loveland	66,859	61,153	375	5,331	8.53	17,898	9,255	27,153	34.08	1.62	$63,654
Fort Collins	143,986	128,211	1,740	14,035	10.96	31,864	25,965	57,829	44.90	1.65	$74,596
Longmont	86,270	71,877	815	13,578	16.68	21,112	12,140	33,252	36.51	.84	$72,881
Greeley	92,889	73,485	1,543	17,861	20.89	18,909	14,518	33,427	43.43	.75	$55,122

first step of analysis, the individual community responses were plotted versus time for each city to determine whether the trends looked approximately linear, exhibited curvature, or displayed the need for transformation. The trends for total population, percent nonwhite, number of owner-occupied units, and number of rental units were essentially linear, while the trends for number of rental units per nonwhite residents and annual median family income displayed quadratic-type curvature. Number of rental units per nonwhite residents was transformed by natural log for better model fit.

Next, the author fitted the ANCOVA models for each response. The linear ANCOVA models in this study included "city" as the treatment factor and "time" as the covariate and modeled the situation such that the response variable had a straight-line (linear) trend over time. The quadratic ANCOVA models added the square of "time" as a second covariate and modeled the situation such that the response variable changed in a quadratic fashion over time. The linear and quadratic ANCOVA models were both longitudinal — that is, they accounted for time. The author fitted a different regression model for each city for each response variable.

To compare the cities' trends over time, the author first tested the overall null hypothesis of equal linear (or quadratic) regression parameters. If the null hypothesis was rejected, then pairwise comparison tests were performed to see which cities' regression parameters were the same and which were different. The focus was on whether Loveland's covariate parameters differed from those of the other cities. Overall tests were conducted at a significance level of .05; to protect against Type 1 errors, pairwise comparisons were tested at a Bonferroni-adjusted significance level of .05 / 6, where six is the number of pairwise comparisons among the four cities (Kuehl, 2000). Adjusted R^2 (related to the ordinary R^2 but accounting for the number of parameters being fitted and the number of observations) was reported as a measure of the goodness of fit of each ANCOVA model. ANCOVA models were fitted using the general linear models (GLM) procedure of SAS version 9.2. The normality of the residuals of the ANCOVA models was checked using the SAS UNIVARIATE procedure; non-normality was not a problem for any of the response variables. Because responses were measured over time, serial correlation was highly likely, so data for individual cities and responses were tested for autocorrelations of order one using the SAS AUTOREG procedure. Serial correlation was not statistically significant for a majority of the models, likely because of the small number of available years; hence, it was not considered a problem.

The analysis suggested that the trends in Loveland were not appreciably different from those in the three sample communities, although Fort Collins's population and other demographic and housing characteristics increased at a much more rapid pace than in the other cities. The high adjusted R^2 suggested a good model fit for all of the response variables considered, with between 93% and 98% of variation in the response variables being explained by the models (Table 6). This analysis suggested that Loveland's growth and development trends, over time, for each of the response variables were similar to those of the sample communities, although some communities exhibited a steeper rate of change. Specifically, the coefficients of the linear models indicated that Loveland was not statistically different from Greeley with regard to the trend over time of total population or from Fort Collins with regard to the trend over time of percent nonwhite. Likewise, Loveland was not statistically different from either Greeley or Longmont with regard to the trends over time of number of owner-occupied units and number of rental units.

The results of the quadratic models used to assess the trends over time of number of rental units per nonwhite residents and annual median family income indicated that Loveland was not statistically different from Fort Collins, Greeley, or Longmont with regard to those trends. These findings indicate that Loveland's impact-fee policy did not make the community more exclusive compared with the sample communities. Loveland did take steps to encourage more multifamily housing by waiving and reducing fees paid by multifamily developers.

TABLE 6. Summary of ANCOVA models for cities of Fort Collins (FC), Greeley (G), Longmont (LM), and Loveland (LL).

Linear ANCOVA Models				
Response variable	Adjusted R^2	Linear trend over time	Overall test *p*-value of equal linear terms (alpha = .05)	Cities for which LL linear coefficient is *not* statistically different (alpha = .05/6)
Total population	.9820	Increasing	$p < .0001$	G
Percent nonwhite	.9311	Increasing	$p = .0006$	FC
No. of owner-occupied units	.9748	Increasing	$p < .0001$	G, LM
No. of rental units	.9890	Increasing	$p < .0001$	G, LM
Quadratic ANCOVA Models				
Response variable	Adjusted R^2	Quadratic trend over time	Overall test *p*-value of equal linear and quadratic terms (alpha = .05)	Cities for which LL linear and quadratic coefficients are *not* statistically different (alpha = .05/6)
Natural log (No. of rental units per nonwhite residents)	.9490	Decreasing but levels out over time	Linear terms $p = .0129$ Quadratic terms $p = .0912$	Linear coefficient: G, LM Quadratic coefficient: FC, G, LM
Annual median family income	.9786	Increasing but levels out over time	Linear terms $p = .9983$ Quadratic terms $p = .6771$	Linear coefficient: FC, G, LM Quadratic coefficient: FC, G, LM

A few limitations of this study should be noted. First, this paper focused on whether Loveland's early imposition of impact fees made the city more exclusive compared with the surrounding communities — it was not intended to look at the actual policies of Loveland or the comparative cities, although the decision to adopt impact fees is a policy decision. Second, the ANCOVA models used in this analysis used time as a predictor variable (covariate) and as such are longitudinal regression models. The author acknowledges that a limitation of this research is that the comparative cities, following Loveland's lead, expanded their impact fees incrementally over a period of years. Moreover, information was unavailable regarding exactly when each fee was adopted in each city, and the data were limited after 1990. Nevertheless, it is the author's opinion that this does not change the finding that Loveland is not statistically different from the other cities with regard to exclusiveness over time. The trend accounts for demographic and housing changes over a period of 50 years. This observation is not meant to imply that this analysis explicitly determines, in all situations, that impact fees may not contribute to exclusiveness, but it is supported by current literature discounting the theory that impact fees increase the cost of housing to the point of rendering a community more exclusive (see, for example, Burge and Ihlanfeldt, 2006).

CONCLUSION

Loveland's impact fees arose from the need to address resident opposition to paying for growth. When residents, in 1981, failed to approve $27 million of general obligation bonds and a 1% sales tax increase that would have funded $40 million for expanded infrastructure and services to accommodate new community growth, the city was forced to seek an alternative funding source (Winters, 2010). The CEF, adopted in 1984 as a long-term solution to the dilemma of rapid growth and the need to expand facilities and services concurrent with growth, was designed to shift the cost of growth-related services and facilities from existing residents to new development. The option implemented a pay-as-you-go funding approach for general-fund expenditures — an approach

TABLE 7. Comparison of 2012 impact fees in Loveland, Fort Collins, Greeley, and Longmont (Data source: Krcmarik, 2014b).

Fee category	Loveland	Fort Collins	Greeley	Longmont
New commercial building: retail (100,000 ft.^{2} shopping center, one 3" water meter, 9.18 acres)				
Fire and rescue	$29,000.00	$22,500.00	$49,900.00	--
Law enforcement	$38,000.00	$15,700.00	$17,000.00	--
General government	$41,000.00	$25,200.00	--	$38,000.00
Streets	$502,000.00	$790,000.00	$717,000.00	$217,950.00
Miscellaneous	--	--	--	$61,556.00
Total	$610,000.00	$853,400.00	$783,900.00	$317,506.00
New commercial building: office (100,000 ft.^{2} general office building, one 3" water meter, 15.30 acres)				
Fire and rescue	$29,000.00	$22,500.00	$62,300.00	--
Law enforcement	$38,000.00	$15,700.00	$8,900.00	--
General government	$41,000.00	$25,200.00	--	$38,000.00
Streets	$302,000.00	$398,800.00	$335,000.00	$107,340.00
Miscellaneous	--	--	--	$40,561.00
Total	$410,000.00	$462,200.00	$406,200.00	$185,901.00
New industrial building (100,000 ft.^{2} warehouse building, one 3" water meter, 15.30 acres)				
Fire and rescue	$3,000.00	$6,200.00	$40,300.00	--
Law enforcement	$4,000.00	$4,300.00	$5,000.00	--
General government	$5,000.00	$7,000.00	--	$38,000.00
Streets	$87,000.00	$144,200.00	$150,000.00	$107,340.00
Miscellaneous	--	--	--	$61,556.00
Total	$99,000.00	$161,700.00	$195,300.00	$206,896.00
New detached, single-family home (10,000 ft.^{2} lot, 2,000 ft.^{2} dwelling, one 3/4" water meter, 150 amp electrical service)				
Fire and rescue	$736.00	$211.00	$275.00	--
Law enforcement	$957.00	$145.00	$133.00	--
General government	$1,052.00	$267.00	--	$1,057.73
Library	$680.00	--	--	--
Museum	$549.00	--	--	--
Parks	$3,351.00	$3,720.00	$2,887.00	$5,253.00
Recreation	$1,679.00	--	--	--
Trails	$532.00	--	$315.00	--
Open lands	$824.00	--	--	--
Streets	$2,169.61	$3,329.00	$2,059.00	$856.49
Miscellaneous	--	--	--	$2,142.50
Total	$12,529.61	$7,672.00	$5,669.00	$9,309.72
New multifamily housing (48-unit, 60,984 ft.^{2} lot, 48,000 ft.^{2} building, one 2" water meter, 150 amp electrical service)				
Fire and rescue	$35,328.00	$7,536.00	$9,216.00	--
Law enforcement	$45,936.00	$5,136.00	$4,464.00	--
General government	$50,496.00	$9,456.00	--	$50,771.04
Library	$32,640.00	--	--	--
Museum	$26,352.00	--	--	--
Parks	$160,848.00	$132,144.00	$96,912.00	$252,144.00
Recreation	$80,592.00	--	--	--
Trails	$25,536.00	--	$6,576.00	--
Open lands	$39,552.00	--	--	--
Streets	$72,365.76	$103,200.00	$68,064.00	$20,442.72
Miscellaneous	--	--	--	$14,890.49
Total	$569,645.76	$257,472.00	$185,232.00	$338,248.25
New multifamily per-unit cost	$11,867.62	$5,364.00	$3,859.00	$7,046.84

that avoided debt financing and allowed, in some cases, the CEF to retire existing debt, which had enabled services and facilities prior to the imposition of the impact fee. The Loveland impact fees have generated over $119.1 million since the policy was implemented in 1984, along with more than $3.5 million in interest on the fees collected. Loveland, like many other Colorado Front Range communities, continually assesses its impact fees in relation to the fees charged by surrounding communities. Table 7 provides a general comparison of impact fees for Loveland, Fort Collins, Greeley, and Longmont, utilizing fee schedules posted in 2012.

The Loveland pay-as-you-go approach has been successful in maintaining an acceptable quality of life in spite of rapid community growth while also providing funds to enable the community to keep pace with growth-related safety, cultural, recreation, and open-space needs. Surveys of local government use of impact fees in 2003, 2007, and 2011 suggested impact fees were an increasingly popular financing technique to shift the cost of necessary development-related capital projects and services to new development (Lawhon, 2012). The old view of the effects of impact fees suggests that they make housing less affordable and development more costly, thus causing the community to become more exclusive, but the new view discounts many of the negative effects attributed to impact fees.

Further, the ANCOVA models used in this research indicated that Loveland was not statistically different from either Greeley or Longmont with regard to the trends over time of number of owner-occupied units and number of rental units. Likewise, the models indicated that Loveland was not statistically different from Fort Collins, Greeley, or Longmont with regard to the trends over time of number of rental units per nonwhite residents and annual median family income. Thus, while this paper does not provide a definitive answer as to whether impact fees generally have an exclusionary effect, these findings do suggest that Loveland's impact-fee policy did not result in a more exclusive community when compared with neighboring communities that broadened their own use of impact fees in the decades following Loveland's pioneering lead. This suggests that the advanced timing of Loveland's impact fees did not make it more exclusive than the surrounding communities. The positive outcome of Loveland's impact-fee program, which has shifted the cost of facilities and services to new development, has been to protect the unique amenities of the community while maintaining a suitable level of infrastructure, facilities, and services necessary for responsible community growth.

NOTES

1. The *Nollan/Dolan* test is based on the decisions of two U.S. Supreme Court cases. In *Nollan v. California Coastal Commission*, the court concluded that exactions (meaning a requirement, regulation, or fee, including an impact fee) imposed must advance a legitimate public interest or concern, and there must be a nexus between the exaction and the impact created by the applicant (U.S. Supreme Court, 1987). *Dolan v. City of Tigard* expanded the scrutiny of exactions by stating that the requirement or fee must be "roughly proportional" to the cost of ameliorating the impact caused by the applicant (U.S. Supreme Court, 1994). Together, the *Nollan/Dolan* decisions require that an "essential nexus" exist between the public interest and the exaction.

2. Multiple sources have stated that the "bond election" would have generated $40 million for needed improvements, implying that the four general obligation bonds themselves would have generated $40 million (see, for example, Barnebey, *et al.*, 1988; Singell and Lillydahl, 1990). In reality, the election included about $27 million in general obligation bond issues and a 1% sales tax increase, which was projected to raise an additional $14 million over the life of the bond retirement. This issue was clarified by Jan Winters (2010), coauthor of Barnebey, *et al.* (1988), who said he believed the $40 million figure was a combination of the taxes that would have been generated by the general obligation bond questions and the funds generated by the increased sales tax. A sixth question on the ballot dealt with the sale of public works buildings in central Loveland that were deemed to be excess property in the eyes of city officials.

3. Although census reporting has changed since 1960, the impact of those changes on the general trends of the comparative cities can be discounted in this study because the methodology changes in census counting affected all four cities (see, for example, Posey and Welniak, 1999; Posey, *et al.*, 2003).

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Additional information may be obtained by writing directly to the author at Department of Landscape Architecture and Regional and Community Planning, Kansas State University, 302 Seaton Hall, Manhattan, KS 66506-2909, USA; email: lawhonll@ksu.edu.

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AUTOBIOGRAPHICAL SKETCH

Larry L. Lawhon (PhD, AICP) is an associate professor in the Department of Landscape Architecture and Regional and Community Planning at Kansas State University. He is a member of the American Planning Association and the American Institute of Certified Planners.

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